

## BAB IV PEMBAHASAN

Bab ini akan membahas mengenai langkah-langkah dalam menentukan determinan dari matriks interval persegi panjang dengan menggunakan metode Radic dan mengaplikasikan sifat-sifat determinan persegi panjang pada matriks interval persegi panjang, serta menerapkan dalam contoh.

### 4.1 Aplikasi Matriks Interval pada Definisi Radic

Sebelum mengaplikasikan sifat-sifat determinan matriks persegi panjang pada matriks interval, akan dicari terlebih dahulu hasil determinan matriks interval persegi panjang berdasarkan Definisi 2.6. Berikut diberikan contoh Definisi 2.6 yang akan diaplikasikan dalam bentuk matriks interval persegi panjang berukuran  $2 \times 7$  dan  $5 \times 7$ .

#### Contoh 4.1:

Diberikan matriks interval  $2 \times 7$  sebagai berikut :

$$A = \begin{bmatrix} [0, 1] & [1, 3] & [2, 3] & [1, 2] & [0, 1] & [-1, 0] & [2, 4] \\ [2, 5] & [1, 2] & [-1, 0] & [1, 3] & [2, 3] & [-1, 1] & [1, 2] \end{bmatrix}$$

Tentukan determinan  $A$  !

#### Penyelesaian :

$$\begin{aligned} |A| &= (-1)^{(1+2)+(1+2)} \begin{vmatrix} [0, 1] & [1, 3] \\ [2, 5] & [1, 2] \end{vmatrix} + (-1)^{(1+2)+(1+3)} \begin{vmatrix} [0, 1] & [2, 3] \\ [2, 5] & [-1, 0] \end{vmatrix} \\ &+ (-1)^{(1+2)+(1+4)} \begin{vmatrix} [0, 1] & [1, 2] \\ [2, 5] & [1, 3] \end{vmatrix} + (-1)^{(1+2)+(1+5)} \begin{vmatrix} [0, 1] & [0, 1] \\ [2, 5] & [2, 3] \end{vmatrix} \\ &+ (-1)^{(1+2)+(1+6)} \begin{vmatrix} [0, 1] & [-1, 0] \\ [2, 5] & [-1, 1] \end{vmatrix} + (-1)^{(1+2)+(1+7)} \begin{vmatrix} [0, 1] & [2, 4] \\ [2, 5] & [1, 2] \end{vmatrix} \\ &+ (-1)^{(1+2)+(2+3)} \begin{vmatrix} [1, 3] & [2, 3] \\ [1, 2] & [-1, 0] \end{vmatrix} + (-1)^{(1+2)+(2+4)} \begin{vmatrix} [1, 3] & [1, 2] \\ [1, 2] & [1, 3] \end{vmatrix} \\ &+ (-1)^{(1+2)+(2+5)} \begin{vmatrix} [1, 3] & [0, 1] \\ [1, 2] & [2, 3] \end{vmatrix} + (-1)^{(1+2)+(2+6)} \begin{vmatrix} [1, 3] & [-1, 0] \\ [1, 2] & [-1, 1] \end{vmatrix} \\ &+ (-1)^{(1+2)+(2+7)} \begin{vmatrix} [1, 3] & [2, 4] \\ [1, 2] & [1, 2] \end{vmatrix} + (-1)^{(1+2)+(3+4)} \begin{vmatrix} [2, 3] & [1, 2] \\ [-1, 0] & [1, 3] \end{vmatrix} \\ &+ (-1)^{(1+2)+(3+5)} \begin{vmatrix} [2, 3] & [0, 1] \\ [-1, 0] & [2, 3] \end{vmatrix} + (-1)^{(1+2)+(3+6)} \begin{vmatrix} [2, 3] & [-1, 0] \\ [-1, 0] & [-1, 1] \end{vmatrix} \end{aligned}$$

$$\begin{aligned}
 & +(-1)^{(1+2)+(3+7)} \begin{vmatrix} [2, 3] & [2, 4] \\ [-1, 0] & [1, 2] \end{vmatrix} + (-1)^{(1+2)+(4+5)} \begin{vmatrix} [1, 2] & [0, 1] \\ [1, 3] & [2, 3] \end{vmatrix} \\
 & +(-1)^{(1+2)+(4+6)} \begin{vmatrix} [1, 2] & [-1, 0] \\ [1, 3] & [-1, 1] \end{vmatrix} + (-1)^{(1+2)+(4+7)} \begin{vmatrix} [1, 2] & [2, 4] \\ [1, 3] & [1, 2] \end{vmatrix} \\
 & +(-1)^{(1+2)+(5+6)} \begin{vmatrix} [0, 1] & [-1, 0] \\ [2, 3] & [-1, 1] \end{vmatrix} + (-1)^{(1+2)+(5+7)} \begin{vmatrix} [0, 1] & [2, 4] \\ [2, 3] & [1, 2] \end{vmatrix} \\
 & +(-1)^{(1+2)+(6+7)} \begin{vmatrix} [-1, 0] & [2, 4] \\ [-1, 1] & [1, 2] \end{vmatrix} \\
 = & ([0, 2] - [2, 15]) - ([-1, 0] - [4, 15]) + ([0, 3] - [2, 10]) \\
 & - ([0, 3] - [0, 5]) + ([-1, 1] - [-5, 0]) - ([0, 2] - [4, 20]) \\
 & + ([-3, 0] - [2, 6]) - ([1, 9] - [1, 4]) + ([2, 9] - [0, 2]) \\
 & - ([-3, 3] - [-2, 0]) + ([1, 6] - [2, 8]) + ([2, 9] - [-2, 0]) \\
 & - ([4, 9] - [-1, 0]) + ([-3, 3] - [0, 1]) - ([2, 6] - [-4, 0]) \\
 & + ([2, 6] - [0, 3]) - ([-2, 2] - [-3, 0]) + ([1, 4] - [2, 12]) \\
 & + ([-1, 1] - [-3, 0]) - ([0, 2] - [4, 12]) + ([-2, 0] - [-4, 4]) \\
 = & [-15, 0] - [-16, -4] + [-10, 1] - [-5, 3] + [-1, 6] - [-20, -2] \\
 & + [-9, -2] - [-3, 8] + [0, 9] - [-3, 5] + [-7, 4] + [2, 11] - [4, 10] \\
 & + [-4, 3] - [2, 10] + [-1, 6] - [-2, 5] + [-11, 2] + [-1, 4] \\
 & - [-12, -2] + [-6, 4] \\
 = & [-66, 103].
 \end{aligned}$$

**Contoh 4.2 :**

Diberikan matriks interval  $5 \times 7$  sebagai berikut :

$$\mathbf{A} = \begin{bmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [2, 3] & [0, 3] & [0, 2] \\ [0, 1] & [1, 3] & [0, 2] & [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{bmatrix}$$

Tentukan determinan  $\mathbf{A}$  !

**Penyelesaian :**

$$|\mathbf{A}| = (-1)^{(1+2+3+4+5)+(1+2+3+4+5)} \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [2, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 &+(-1)^{(1+2+3+4+5)+(1+2+3+4+6)} \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix} \\
 &+(-1)^{(1+2+3+4+5)+(1+2+3+4+7)} \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [0, 1] \end{vmatrix} \\
 &+(-1)^{(1+2+3+4+5)+(1+2+3+5+6)} \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [2, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [0, 3] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix} \\
 &+(-1)^{(1+2+3+4+5)+(1+2+3+5+7)} \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [2, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 &+(-1)^{(1+2+3+4+5)+(1+2+3+6+7)} \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [0, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] & [0, 1] \end{vmatrix} \\
 &+(-1)^{(1+2+3+4+5)+(1+2+4+5+6)} \begin{vmatrix} [1, 2] & [0, 1] & [1, 3] & [2, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [1, 3] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \\
 &+(-1)^{(1+2+3+4+5)+(1+2+4+5+7)} \begin{vmatrix} [1, 2] & [0, 1] & [1, 3] & [2, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [-1, 1] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 3] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 3] & [1, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\
 &+(-1)^{(1+2+3+4+5)+(1+2+4+6+7)} \begin{vmatrix} [1, 2] & [0, 1] & [1, 3] & [0, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [-1, 1] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix}
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$+(-1)^{(1+2+3+4+5)+(1+2+5+6+7)} \begin{vmatrix} [1, 2] & [0, 1] & [2, 3] & [0, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

$$+(-1)^{(1+2+3+4+5)+(1+3+4+5+6)} \begin{vmatrix} [1, 2] & [-1, 0] & [1, 3] & [2, 3] & [0, 3] \\ [-1, 1] & [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix}$$

$$+(-1)^{(1+2+3+4+5)+(1+3+4+5+7)} \begin{vmatrix} [1, 2] & [-1, 0] & [1, 3] & [2, 3] & [0, 2] \\ [-1, 1] & [0, 2] & [-1, 1] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 3] & [0, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix}$$

$$+(-1)^{(1+2+3+4+5)+(1+3+4+6+7)} \begin{vmatrix} [1, 2] & [-1, 0] & [1, 3] & [0, 3] & [0, 2] \\ [-1, 1] & [0, 2] & [-1, 1] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 2] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

$$+(-1)^{(1+2+3+4+5)+(1+3+5+6+7)} \begin{vmatrix} [1, 2] & [-1, 0] & [2, 3] & [0, 3] & [0, 2] \\ [-1, 1] & [0, 2] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 2] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

$$+(-1)^{(1+2+3+4+5)+(1+4+5+6+7)} \begin{vmatrix} [1, 2] & [1, 3] & [2, 3] & [0, 3] & [0, 2] \\ [-1, 1] & [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

$$+(-1)^{(1+2+3+4+5)+(2+3+4+5+6)} \begin{vmatrix} [0, 1] & [-1, 0] & [1, 3] & [2, 3] & [0, 3] \\ [1, 3] & [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix}$$

$$+(-1)^{(1+2+3+4+5)+(2+3+4+5+7)} \begin{vmatrix} [0, 1] & [-1, 0] & [1, 3] & [2, 3] & [0, 2] \\ [1, 3] & [0, 2] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [1, 2] & [0, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengemukakan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & +(-1)^{(1+2+3+4+5)+(2+3+4+6+7)} \begin{vmatrix} [0,1] & [-1,0] & [1,3] & [0,3] & [0,2] \\ [1,3] & [0,2] & [-1,1] & [1,2] & [-1,0] \\ [1,2] & [1,3] & [-1,0] & [0,1] & [-1,1] \\ [1,3] & [1,2] & [-1,1] & [-1,0] & [2,3] \\ [1,2] & [0,2] & [0,3] & [1,3] & [0,1] \end{vmatrix} \\
 & +(-1)^{(1+2+3+4+5)+(2+3+5+6+7)} \begin{vmatrix} [0,1] & [-1,0] & [2,3] & [0,3] & [0,2] \\ [1,3] & [0,2] & [0,3] & [1,2] & [-1,0] \\ [1,2] & [1,3] & [0,2] & [0,1] & [-1,1] \\ [1,3] & [1,2] & [0,1] & [-1,0] & [2,3] \\ [1,2] & [0,2] & [2,3] & [1,3] & [0,1] \end{vmatrix} \\
 & +(-1)^{(1+2+3+4+5)+(2+4+5+6+7)} \begin{vmatrix} [0,1] & [1,3] & [2,3] & [0,3] & [0,2] \\ [1,3] & [-1,1] & [0,3] & [1,2] & [-1,0] \\ [1,2] & [-1,0] & [0,2] & [0,1] & [-1,1] \\ [1,3] & [-1,1] & [0,1] & [-1,0] & [2,3] \\ [1,2] & [0,3] & [2,3] & [1,3] & [0,1] \end{vmatrix} \\
 & +(-1)^{(1+2+3+4+5)+(3+4+5+6+7)} \begin{vmatrix} [-1,0] & [1,3] & [2,3] & [0,3] & [0,2] \\ [0,2] & [-1,1] & [0,3] & [1,2] & [-1,0] \\ [1,3] & [-1,0] & [0,2] & [0,1] & [-1,1] \\ [1,2] & [-1,1] & [0,1] & [-1,0] & [2,3] \\ [0,2] & [0,3] & [2,3] & [1,3] & [0,1] \end{vmatrix}
 \end{aligned}$$

dengan menggunakan ekspansi kofaktor sebagai berikut :

$$\begin{aligned}
 & = \left( [1,2] \begin{vmatrix} [1,3] & [0,2] & [-1,1] & [0,3] \\ [1,2] & [1,3] & [-1,0] & [0,2] \\ [1,3] & [1,2] & [-1,1] & [0,1] \\ [1,2] & [0,2] & [0,3] & [2,3] \end{vmatrix} \right. \\
 & \quad - [0,1] \begin{vmatrix} [-1,1] & [0,2] & [-1,1] & [0,3] \\ [2,3] & [1,3] & [-1,0] & [0,2] \\ [0,1] & [1,2] & [-1,1] & [0,1] \\ [0,3] & [0,2] & [0,3] & [2,3] \end{vmatrix} \\
 & \quad + [-1,0] \begin{vmatrix} [-1,1] & [1,3] & [-1,1] & [0,3] \\ [2,3] & [1,2] & [-1,0] & [0,2] \\ [0,1] & [1,3] & [-1,1] & [0,1] \\ [0,3] & [1,2] & [0,3] & [2,3] \end{vmatrix} \\
 & \quad - [1,3] \begin{vmatrix} [-1,1] & [1,3] & [0,2] & [0,3] \\ [2,3] & [1,2] & [1,3] & [0,2] \\ [0,1] & [1,3] & [1,2] & [0,1] \\ [0,3] & [1,2] & [0,2] & [2,3] \end{vmatrix} \\
 & \quad \left. + [2,3] \begin{vmatrix} [-1,1] & [1,3] & [0,2] & [-1,1] \\ [2,3] & [1,2] & [1,3] & [-1,0] \\ [0,1] & [1,3] & [1,2] & [-1,1] \\ [0,3] & [1,2] & [0,2] & [0,3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{bmatrix} [1, 3] & [0, 2] & [-1, 1] & [1, 2] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [0, 3] & [1, 3] \end{bmatrix} \right. \\
 & \quad - [0, 1] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [0, 3] & [1, 3] \end{bmatrix} \\
 & \quad + [-1, 0] \begin{bmatrix} [-1, 1] & [1, 3] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 3] & [-1, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 3] & [1, 3] \end{bmatrix} \\
 & \quad - [1, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] \end{bmatrix} \\
 & \quad \left. + [0, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 1] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] \end{bmatrix} \right) \\
 & - \left( [1, 2] \begin{bmatrix} [1, 3] & [0, 2] & [0, 3] & [1, 2] \\ [1, 2] & [1, 3] & [0, 2] & [0, 1] \\ [1, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [2, 3] & [1, 3] \end{bmatrix} \right. \\
 & \quad - [0, 1] \begin{bmatrix} [-1, 1] & [0, 2] & [0, 3] & [1, 2] \\ [2, 3] & [1, 3] & [0, 2] & [0, 1] \\ [0, 1] & [1, 2] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [2, 3] & [1, 3] \end{bmatrix} \\
 & \quad + [-1, 0] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 3] & [1, 2] \\ [2, 3] & [1, 2] & [0, 2] & [0, 1] \\ [0, 1] & [1, 3] & [0, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [2, 3] & [1, 3] \end{bmatrix} \\
 & \quad - [2, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] \end{bmatrix} \\
 & \quad \left. + [0, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] \end{bmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{vmatrix} [1, 3] & [0, 2] & [0, 3] & [-1, 0] \\ [1, 2] & [1, 3] & [0, 2] & [-1, 1] \\ [1, 3] & [1, 2] & [0, 1] & [2, 3] \\ [1, 2] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 2] & [0, 1] & [2, 3] \\ [0, 3] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 3] & [0, 1] & [2, 3] \\ [0, 3] & [1, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] \end{vmatrix} \right) \\
 & + \left( [1, 2] \begin{vmatrix} [1, 3] & [0, 2] & [1, 2] & [-1, 0] \\ [1, 2] & [1, 3] & [0, 1] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 0] & [2, 3] \\ [1, 2] & [0, 2] & [1, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 2] & [1, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [1, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{bmatrix} [1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 2] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 3] & [-1, 1] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 3] & [2, 3] & [1, 3] \end{bmatrix} \right. \\
 & \quad - [0, 1] \begin{bmatrix} [-1, 1] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 3] & [2, 3] & [1, 3] \end{bmatrix} \\
 & \quad + [-1, 0] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 3] & [1, 2] \\ [2, 3] & [1, 2] & [0, 2] & [0, 1] \\ [0, 1] & [1, 3] & [0, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [2, 3] & [1, 3] \end{bmatrix} \\
 & \quad - [2, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 3] & [-1, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 3] & [1, 3] \end{bmatrix} \\
 & \quad \left. + [0, 2] \begin{bmatrix} [-1, 1] & [1, 3] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 3] & [-1, 1] & [0, 1] \\ [0, 3] & [1, 2] & [0, 3] & [2, 3] \end{bmatrix} \right) \\
 & + \left( [1, 2] \begin{bmatrix} [1, 3] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 2] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 3] & [-1, 1] & [0, 1] & [2, 3] \\ [1, 2] & [0, 3] & [2, 3] & [0, 1] \end{bmatrix} \right. \\
 & \quad - [0, 1] \begin{bmatrix} [-1, 1] & [-1, 1] & [0, 3] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 3] & [0, 3] & [2, 3] & [0, 1] \end{bmatrix} \\
 & \quad + [1, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 3] & [0, 1] & [2, 3] \\ [0, 3] & [1, 2] & [2, 3] & [0, 1] \end{bmatrix} \\
 & \quad - [2, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [-1, 1] & [-1, 0] \\ [2, 3] & [1, 2] & [-1, 0] & [-1, 1] \\ [0, 1] & [1, 3] & [-1, 1] & [2, 3] \\ [0, 3] & [1, 2] & [0, 3] & [0, 1] \end{bmatrix} \\
 & \quad \left. + [0, 2] \begin{bmatrix} [-1, 1] & [1, 3] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 3] & [-1, 1] & [0, 1] \\ [0, 3] & [1, 2] & [0, 3] & [2, 3] \end{bmatrix} \right)
 \end{aligned}$$



Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1,2] \begin{bmatrix} [1,3] & [-1,1] & [1,2] & [-1,0] \\ [1,2] & [-1,0] & [0,1] & [-1,1] \\ [1,3] & [-1,1] & [-1,0] & [2,3] \\ [1,2] & [0,3] & [1,3] & [0,1] \end{bmatrix} \right. \\
 & \quad - [0,1] \begin{bmatrix} [-1,1] & [-1,1] & [1,2] & [-1,0] \\ [2,3] & [-1,0] & [0,1] & [-1,1] \\ [0,1] & [-1,1] & [-1,0] & [2,3] \\ [0,3] & [0,3] & [1,3] & [0,1] \end{bmatrix} \\
 & \quad + [1,3] \begin{bmatrix} [-1,1] & [1,3] & [1,2] & [-1,0] \\ [2,3] & [1,2] & [0,1] & [-1,1] \\ [0,1] & [1,3] & [-1,0] & [2,3] \\ [0,3] & [1,2] & [1,3] & [0,1] \end{bmatrix} \\
 & \quad - [0,3] \begin{bmatrix} [-1,1] & [1,3] & [-1,1] & [-1,0] \\ [2,3] & [1,2] & [-1,0] & [-1,1] \\ [0,1] & [1,3] & [-1,1] & [2,3] \\ [0,3] & [1,2] & [0,3] & [0,1] \end{bmatrix} \\
 & \quad \left. + [0,2] \begin{bmatrix} [-1,1] & [1,3] & [-1,1] & [1,2] \\ [2,3] & [1,2] & [-1,0] & [0,1] \\ [0,1] & [1,3] & [-1,1] & [-1,0] \\ [0,3] & [1,2] & [0,3] & [1,3] \end{bmatrix} \right) \\
 & + \left( [1,2] \begin{bmatrix} [1,3] & [0,3] & [1,2] & [-1,0] \\ [1,2] & [0,2] & [0,1] & [-1,1] \\ [1,3] & [0,1] & [-1,0] & [2,3] \\ [1,2] & [2,3] & [1,3] & [0,1] \end{bmatrix} \right. \\
 & \quad - [0,1] \begin{bmatrix} [-1,1] & [0,3] & [1,2] & [-1,0] \\ [2,3] & [0,2] & [0,1] & [-1,1] \\ [0,1] & [0,1] & [-1,0] & [2,3] \\ [0,3] & [2,3] & [1,3] & [0,1] \end{bmatrix} \\
 & \quad + [2,3] \begin{bmatrix} [-1,1] & [1,3] & [1,2] & [-1,0] \\ [2,3] & [1,2] & [0,1] & [-1,1] \\ [0,1] & [1,3] & [-1,0] & [2,3] \\ [0,3] & [1,2] & [1,3] & [0,1] \end{bmatrix} \\
 & \quad - [0,3] \begin{bmatrix} [-1,1] & [1,3] & [0,3] & [-1,0] \\ [2,3] & [1,2] & [0,2] & [-1,1] \\ [0,1] & [1,3] & [0,1] & [2,3] \\ [0,3] & [1,2] & [2,3] & [0,1] \end{bmatrix} \\
 & \quad \left. + [0,2] \begin{bmatrix} [-1,1] & [1,3] & [0,3] & [1,2] \\ [2,3] & [1,2] & [0,2] & [0,1] \\ [0,1] & [1,3] & [0,1] & [-1,0] \\ [0,3] & [1,2] & [2,3] & [1,3] \end{bmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{vmatrix} [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \right. \\
 & \quad - [-1, 0] \begin{vmatrix} [-1, 1] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [-1, 1] & [0, 2] & [0, 3] & [1, 2] \\ [2, 3] & [1, 3] & [0, 2] & [0, 1] \\ [0, 1] & [1, 2] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [-1, 1] & [0, 2] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix} \\
 & \quad \left. + [0, 3] \begin{vmatrix} [-1, 1] & [0, 2] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \right) \\
 & - \left( [1, 2] \begin{vmatrix} [0, 2] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [-1, 0] \begin{vmatrix} [-1, 1] & [-1, 1] & [0, 3] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 3] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [-1, 1] & [0, 2] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 2] & [0, 1] & [2, 3] \\ [0, 3] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [-1, 1] & [0, 2] & [-1, 1] & [-1, 0] \\ [2, 3] & [1, 3] & [-1, 0] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [2, 3] \\ [0, 3] & [0, 2] & [0, 3] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [-1, 1] & [0, 2] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{bmatrix} [0, 2] & [-1, 1] & [1, 2] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 2] & [0, 3] & [1, 3] & [0, 1] \end{bmatrix} \right. \\
 & \quad - [-1, 0] \begin{bmatrix} [-1, 1] & [-1, 1] & [1, 2] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 3] & [1, 3] & [0, 1] \end{bmatrix} \\
 & \quad + [1, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 2] & [1, 3] & [0, 1] \end{bmatrix} \\
 & \quad - [2, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [-1, 0] \\ [2, 3] & [1, 3] & [-1, 0] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [2, 3] \\ [0, 3] & [0, 2] & [0, 3] & [0, 1] \end{bmatrix} \\
 & \quad \left. + [0, 2] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [0, 3] & [1, 3] \end{bmatrix} \right) \\
 & - \left( [1, 2] \begin{bmatrix} [0, 2] & [0, 3] & [1, 2] & [-1, 0] \\ [1, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 2] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 2] & [2, 3] & [1, 3] & [0, 1] \end{bmatrix} \right. \\
 & \quad - [-1, 0] \begin{bmatrix} [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{bmatrix} \\
 & \quad + [2, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 2] & [1, 3] & [0, 1] \end{bmatrix} \\
 & \quad - [0, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 2] & [0, 1] & [2, 3] \\ [0, 3] & [0, 2] & [2, 3] & [0, 1] \end{bmatrix} \\
 & \quad \left. + [0, 2] \begin{bmatrix} [-1, 1] & [0, 2] & [0, 3] & [1, 2] \\ [2, 3] & [1, 3] & [0, 2] & [0, 1] \\ [0, 1] & [1, 2] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [2, 3] & [1, 3] \end{bmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{vmatrix} [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [-1, 0] \begin{vmatrix} [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [2, 3] \begin{vmatrix} [-1, 1] & [-1, 1] & [1, 2] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [0, 3] \begin{vmatrix} [-1, 1] & [-1, 1] & [0, 3] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 3] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [-1, 1] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \right) \\
 & - \left( [0, 1] \begin{vmatrix} [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \right. \\
 & \quad - [-1, 0] \begin{vmatrix} [1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 2] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 3] & [-1, 1] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [1, 3] & [0, 2] & [0, 3] & [1, 2] \\ [1, 2] & [1, 3] & [0, 2] & [0, 1] \\ [1, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [1, 3] & [0, 2] & [-1, 1] & [1, 2] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix} \\
 & \quad \left. + [0, 3] \begin{vmatrix} [1, 3] & [0, 2] & [-1, 1] & [0, 3] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 2] \\ [1, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [1, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [0,1] \begin{vmatrix} [0,2] & [-1,1] & [0,3] & [-1,0] \\ [1,3] & [-1,0] & [0,2] & [-1,1] \\ [1,2] & [-1,1] & [0,1] & [2,3] \\ [0,2] & [0,3] & [2,3] & [0,1] \end{vmatrix} \right. \\
 & \quad - [-1,0] \begin{vmatrix} [1,3] & [-1,1] & [0,3] & [-1,0] \\ [1,2] & [-1,0] & [0,2] & [-1,1] \\ [1,3] & [-1,1] & [0,1] & [2,3] \\ [1,2] & [0,3] & [2,3] & [0,1] \end{vmatrix} \\
 & \quad + [1,3] \begin{vmatrix} [1,3] & [0,2] & [0,3] & [-1,0] \\ [1,2] & [1,3] & [0,2] & [-1,1] \\ [1,3] & [1,2] & [0,1] & [2,3] \\ [1,2] & [0,2] & [2,3] & [0,1] \end{vmatrix} \\
 & \quad - [2,3] \begin{vmatrix} [1,3] & [0,2] & [-1,1] & [-1,0] \\ [1,2] & [1,3] & [-1,0] & [-1,1] \\ [1,3] & [1,2] & [-1,1] & [2,3] \\ [1,2] & [0,2] & [0,3] & [0,1] \end{vmatrix} \\
 & \quad \left. + [0,2] \begin{vmatrix} [1,3] & [0,2] & [-1,1] & [0,3] \\ [1,2] & [1,3] & [-1,0] & [0,2] \\ [1,3] & [1,2] & [-1,1] & [0,1] \\ [1,2] & [0,2] & [0,3] & [2,3] \end{vmatrix} \right) \\
 & - \left( [0,1] \begin{vmatrix} [0,2] & [-1,1] & [1,2] & [-1,0] \\ [1,3] & [-1,0] & [0,1] & [-1,1] \\ [1,2] & [-1,1] & [-1,0] & [2,3] \\ [0,2] & [0,3] & [1,3] & [0,1] \end{vmatrix} \right. \\
 & \quad - [-1,0] \begin{vmatrix} [1,3] & [-1,1] & [1,2] & [-1,0] \\ [1,2] & [-1,0] & [0,1] & [-1,1] \\ [1,3] & [-1,1] & [-1,0] & [2,3] \\ [1,2] & [0,3] & [1,3] & [0,1] \end{vmatrix} \\
 & \quad + [1,3] \begin{vmatrix} [1,3] & [0,2] & [1,2] & [-1,0] \\ [1,2] & [1,3] & [0,1] & [-1,1] \\ [1,3] & [1,2] & [-1,0] & [2,3] \\ [1,2] & [0,2] & [1,3] & [0,1] \end{vmatrix} \\
 & \quad - [0,3] \begin{vmatrix} [1,3] & [0,2] & [-1,1] & [-1,0] \\ [1,2] & [1,3] & [-1,0] & [-1,1] \\ [1,3] & [1,2] & [-1,1] & [2,3] \\ [1,2] & [0,2] & [0,3] & [0,1] \end{vmatrix} \\
 & \quad \left. + [0,2] \begin{vmatrix} [1,3] & [0,2] & [-1,1] & [1,2] \\ [1,2] & [1,3] & [-1,0] & [0,1] \\ [1,3] & [1,2] & [-1,1] & [-1,0] \\ [1,2] & [0,2] & [0,3] & [1,3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [0,1] \begin{vmatrix} [0,2] & [0,3] & [1,2] & [-1,0] \\ [1,3] & [0,2] & [0,1] & [-1,1] \\ [1,2] & [0,1] & [-1,0] & [2,3] \\ [0,2] & [2,3] & [1,3] & [0,1] \end{vmatrix} \right. \\
 & \quad - [-1,0] \begin{vmatrix} [1,3] & [0,3] & [1,2] & [-1,0] \\ [1,2] & [0,2] & [0,1] & [-1,1] \\ [1,3] & [0,1] & [-1,0] & [2,3] \\ [1,2] & [2,3] & [1,3] & [0,1] \end{vmatrix} \\
 & \quad + [1,3] \begin{vmatrix} [1,3] & [0,2] & [1,2] & [-1,0] \\ [1,2] & [1,3] & [0,1] & [-1,1] \\ [1,3] & [1,2] & [-1,0] & [2,3] \\ [1,2] & [0,2] & [1,3] & [0,1] \end{vmatrix} \\
 & \quad - [0,3] \begin{vmatrix} [1,3] & [0,2] & [0,3] & [-1,0] \\ [1,2] & [1,3] & [0,2] & [-1,1] \\ [1,3] & [1,2] & [0,1] & [2,3] \\ [1,2] & [0,2] & [2,3] & [0,1] \end{vmatrix} \\
 & \quad \left. + [0,2] \begin{vmatrix} [1,3] & [0,2] & [0,3] & [1,2] \\ [1,2] & [1,3] & [0,2] & [0,1] \\ [1,3] & [1,2] & [0,1] & [-1,0] \\ [1,2] & [0,2] & [2,3] & [1,3] \end{vmatrix} \right) \\
 & - \left( [0,1] \begin{vmatrix} [-1,1] & [0,3] & [1,2] & [-1,0] \\ [-1,0] & [0,2] & [0,1] & [-1,1] \\ [-1,1] & [0,1] & [-1,0] & [2,3] \\ [0,3] & [2,3] & [1,3] & [0,1] \end{vmatrix} \right. \\
 & \quad - [1,3] \begin{vmatrix} [1,3] & [0,3] & [1,2] & [-1,0] \\ [1,2] & [0,2] & [0,1] & [-1,1] \\ [1,3] & [0,1] & [-1,0] & [2,3] \\ [1,2] & [2,3] & [1,3] & [0,1] \end{vmatrix} \\
 & \quad + [2,3] \begin{vmatrix} [1,3] & [-1,1] & [1,2] & [-1,0] \\ [1,2] & [-1,0] & [0,1] & [-1,1] \\ [1,3] & [-1,1] & [-1,0] & [2,3] \\ [1,2] & [0,3] & [1,3] & [0,1] \end{vmatrix} \\
 & \quad - [0,3] \begin{vmatrix} [1,3] & [-1,1] & [0,3] & [-1,0] \\ [1,2] & [-1,0] & [0,2] & [-1,1] \\ [1,3] & [-1,1] & [0,1] & [2,3] \\ [1,2] & [0,3] & [2,3] & [0,1] \end{vmatrix} \\
 & \quad \left. + [0,2] \begin{vmatrix} [1,3] & [-1,1] & [0,3] & [1,2] \\ [1,2] & [-1,0] & [0,2] & [0,1] \\ [1,3] & [-1,1] & [0,1] & [-1,0] \\ [1,2] & [0,3] & [2,3] & [1,3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \begin{pmatrix} [-1, 0] \begin{vmatrix} [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix} \\ & - [1, 3] \begin{vmatrix} [0, 2] & [0, 3] & [1, 2] & [-1, 0] \\ [1, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 2] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 2] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix} \\ & + [2, 3] \begin{vmatrix} [0, 2] & [-1, 1] & [1, 2] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 2] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix} \\ & - [0, 3] \begin{vmatrix} [0, 2] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\ & + [0, 2] \begin{vmatrix} [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \end{pmatrix}
 \end{aligned}$$

dengan menggunakan ekspansi kofaktor di peroleh hasil :

$$\begin{aligned}
 & = ([1, 2][-253, 286] - [0, 1][-221, 188] + [-1, 0][-287, 203] \\ & \quad - [1, 3][-275, 301] + [2, 3][-256, 245]) \\ & - (([1, 2][-189, 213] - [0, 1][-195, 133] + [-1, 0][-255, 145] \\ & \quad - [1, 3][-230, 240] + [0, 3][-230, 247]) \\ & + (([1, 2][-239, 220] - [0, 1][-129, 212] + [-1, 0][-117, 250] \\ & \quad - [1, 3][-236, 207] + [0, 2][-230, 247]) \\ & - (([1, 2][-250, 252] - [0, 1][-194, 174] + [-1, 0][-216, 220] \\ & \quad - [2, 3][-230, 240] + [0, 3][-263, 304]) \\ & + (([1, 2][-242, 192] - [0, 1][-169, 249] + [-1, 0][-176, 243] \\ & \quad - [2, 3][-236, 207] + [0, 2][-293, 274]) \\ & + (([1, 2][-208, 217] - [0, 1][-158, 218] + [-1, 0][-172, 238] \\ & \quad - [2, 3][-236, 207] + [0, 2][-233, 243]) \\ & - (([1, 2][-158, 164] - [0, 1][-138, 150] + [-1, 0][-216, 220] \\ & \quad - [2, 3][-228, 154] + [0, 2][-264, 171])
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 &+([1, 2][-238, 106] - [0, 1][-224, 123] + [1, 3][-176, 243] \\
 &\quad - [2, 3][-117, 250] + [0, 2][-270, 174]) \\
 &-([1, 2][-135, 172] - [0, 1][-168, 98] + [1, 3][-172, 238] \\
 &\quad - [0, 3][-117, 250] + [0, 2][-228, 138]) \\
 &+([1, 2][-203, 198] - [0, 1][-168, 188] + [2, 3][-172, 238] \\
 &\quad - [0, 3][-185, 252] + [0, 2][-216, 172]) \\
 &+([1, 2][-183, 185] - [-1, 0][-129, 189] + [1, 3][-194, 174] \\
 &\quad - [2, 3][-189, 171] + [0, 3][-220, 253]) \\
 &-([1, 2][-261, 143] - [-1, 0][-224, 123] + [1, 3][-169, 249] \\
 &\quad - [2, 3][-129, 212] + [0, 2][-233, 186]) \\
 &+([1, 2][-153, 158] - [-1, 0][-168, 104] + [1, 3][-158, 218] \\
 &\quad - [2, 3][-129, 212] + [0, 2][-177, 139]) \\
 &-([1, 2][-202, 204] - [-1, 0][-168, 188] + [2, 3][-158, 184] \\
 &\quad - [0, 3][-169, 249] + [0, 2][-182, 174]) \\
 &+([1, 2][-239, 92] - [-1, 0][-168, 188] + [2, 3][-168, 104] \\
 &\quad - [0, 3][-224, 123] + [0, 2][-148, 158]) \\
 &-([0, 1][-183, 185] - [-1, 0][-158, 164] + [1, 3][-250, 252] \\
 &\quad - [2, 3][-189, 213] + [0, 3][-201, 240]) \\
 &+([0, 1][-261, 133] - [-1, 0][-247, 115] + [1, 3][-242, 192] \\
 &\quad - [2, 3][-239, 220] + [0, 2][-201, 240]) \\
 &-([0, 1][-153, 158] - [-1, 0][-135, 172] + [1, 3][-198, 217] \\
 &\quad - [0, 3][-239, 220] + [0, 2][-192, 216]) \\
 &+([0, 1][-202, 204] - [-1, 0][-203, 198] + [1, 3][-198, 217] \\
 &\quad - [0, 3][-242, 192] + [0, 2][-250, 252]) \\
 &-([0, 1][-239, 92] - [1, 3][-203, 198] + [2, 3][-135, 172] \\
 &\quad - [0, 3][-247, 115] + [0, 2][-158, 164]) \\
 &+([-1, 0][-239, 92] - [1, 3][-202, 204] + [2, 3][-153, 158] \\
 &\quad - [0, 3][-261, 133] + [0, 2][-183, 185]) \\
 &+([-506, 572] - [-221, 188] + [-203, 287] - [-825, 903] + [-768, 735]) \\
 &-([-378, 426] - [-195, 133] + [-145, 255] - [-690, 720] + [-690, 741]) \\
 &+([-478, 440] - [-129, 212] + [-250, 117] - [-708, 621] + [-460, 494]) \\
 &-([-500, 504] - [-194, 174] + [-220, 216] - [-690, 720] + [-789, 912]) \\
 &+([-484, 384] - [-169, 249] + [-243, 176] - [-708, 621] + [-586, 548])
 \end{aligned}$$



**Hak Cipta Dilindungi Undang-Undang**

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengemukakan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 &+([-416, 434] - [-158, 218] + [-238, 172] - [-708, 621] + [-466, 486]) \\
 &-([-316, 328] - [-138, 150] + [-220, 216] - [-684, 462] + [-528, 342]) \\
 &+([-476, 212] - [-224, 123] + [-528, 729] - [-351, 750] + [-540, 348]) \\
 &-([-270, 344] - [-168, 98] + [-516, 714] - [-351, 750] + [-456, 276]) \\
 &+([-406, 396] - [-168, 188] + [-516, 714] - [-555, 756] + [-432, 344]) \\
 &+([-366, 370] - [-189, 129] + [-582, 522] - [-567, 513] + [-660, 759]) \\
 &-([-522, 286] - [-123, 224] + [-507, 747] - [-387, 636] + [-466, 372]) \\
 &+([-306, 316] - [-104, 168] + [-474, 654] - [-387, 636] + [-354, 278]) \\
 &-([-404, 408] - [-188, 168] + [-474, 552] - [-507, 747] + [-364, 348]) \\
 &+([-478, 184] - [-188, 168] + [-504, 312] - [-672, 369] + [-296, 316]) \\
 &-([-183, 185] - [-164, 158] + [-750, 756] - [-567, 639] + [-603, 720]) \\
 &+([-261, 133] - [-115, 247] + [-726, 576] - [-717, 660] + [-402, 480]) \\
 &-([-153, 158] - [-172, 135] + [-594, 651] - [-717, 660] + [-384, 432]) \\
 &+([-202, 204] - [-198, 203] + [-594, 651] - [-726, 576] + [-500, 504]) \\
 &-([-239, 92] - [-609, 594] + [-405, 516] - [-741, 345] + [-316, 328]) \\
 &+([-92, 239] - [-606, 612] + [-459, 474] - [-783, 399] + [-366, 370]) \\
 &= ([-2568, 2640]) - ([-2066, 2307]) + ([-2021, 1888]) + ([-2403, 2516]) \\
 &- ([-2183, 1985]) + ([-1959, 1958]) - ([-1676, 1708]) + ([-2417, 1864]) \\
 &- ([-2090, 1853]) + ([-2298, 2177]) + ([-2250, 2407]) - ([-2355, 1915]) \\
 &+ ([-1938, 1739]) - ([-2157, 2003]) + ([-1815, 1672]) - ([-2333, 2392]) \\
 &+ ([-2296, 2021]) - ([-1926, 2130]) + ([-2075, 2283]) - ([-1899, 2286]) \\
 &+ ([-1928, 2472]) \\
 &= [-44547, 44322]
 \end{aligned}$$

## 4.2 Sifat-Sifat Determinan Matriks Persegi Panjang

Pada subbab ini akan dipaparkan aplikasi matriks interval pada sifat-sifat determinan matriks persegi panjang. Berikut diberikan sifat-sifat determinan Radic untuk matriks interval persegi panjang berukuran  $2 \times 7$  berdasarkan Teorema 2.1:

### Contoh 4.3

Diberikan matriks interval persegi panjang  $2 \times 7$  sebagai berikut :

**Hak Cipta Dilindungi Undang-Undang**

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengemukakan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$A = \begin{bmatrix} [0, 1] & [1, 3] & [2, 3] & [1, 2] & [0, 1] & [-1, 0] & [2, 4] \\ [2, 5] & [1, 2] & [-1, 0] & [1, 3] & [2, 3] & [-1, 1] & [1, 2] \end{bmatrix}$$

Tentukan determinan dari matriks  $A$  !

**Penyelesaian :**

$$|A_1, A_2 - A_3 + A_4 - A_5 + A_6 - A_7| = \begin{vmatrix} [0, 1] & [-7, 1] \\ [2, 5] & [-4, 4] \end{vmatrix}$$

$$|A_2, A_3 - A_4 + A_5 - A_6 + A_7| = \begin{vmatrix} [1, 3] & [2, 8] \\ [1, 2] & [-2, 5] \end{vmatrix}$$

$$|A_3, A_4 - A_5 + A_6 - A_7| = \begin{vmatrix} [2, 3] & [-5, 0] \\ [-1, 0] & [-5, 1] \end{vmatrix}$$

$$|A_4, A_5 - A_6 + A_7| = \begin{vmatrix} [1, 2] & [2, 6] \\ [1, 3] & [2, 6] \end{vmatrix}$$

$$|A_5, A_6 - A_7| = \begin{vmatrix} [0, 1] & [-5, -2] \\ [2, 3] & [-3, 0] \end{vmatrix}$$

$$|A_6, A_7| = \begin{vmatrix} [-1, 0] & [2, 4] \\ [-1, 1] & [1, 2] \end{vmatrix}$$

sehingga

$$\begin{aligned} |A| &= \begin{vmatrix} [0, 1] & [-7, 1] \\ [2, 5] & [-4, 4] \end{vmatrix} + \begin{vmatrix} [1, 3] & [2, 8] \\ [1, 2] & [-2, 5] \end{vmatrix} + \begin{vmatrix} [2, 3] & [-5, 0] \\ [-1, 0] & [-5, 1] \end{vmatrix} \\ &\quad + \begin{vmatrix} [1, 2] & [2, 6] \\ [1, 3] & [2, 6] \end{vmatrix} + \begin{vmatrix} [0, 1] & [-5, -2] \\ [2, 3] & [-3, 0] \end{vmatrix} + \begin{vmatrix} [-1, 0] & [2, 4] \\ [-1, 1] & [1, 2] \end{vmatrix} \\ &= ([-4, 4] - [-35, 5]) + ([-6, 15] - [2, 16]) + ([-15, 3] - [0, 5]) \\ &\quad + ([2, 12] - [2, 18]) + ([-3, 0] - [-15, -4]) \\ &\quad + ([-2, 0] - [-4, 4]) \\ &= [-9, 39] + [-22, 13] + [-20, 3] + [-16, 10] + [1, 15] + [-6, 4] \\ &= [-72, 84] \end{aligned}$$

Pada Contoh 4.1 dan 4.3 diperoleh hasil yang berbeda dengan matriks yang sama, sehingga disimpulkan bahwa Teorema 2.1 tidak berlaku untuk matriks interval.

Selanjutnya diberikan contoh berdasarkan Teorema 2.2 yang akan diaplikasikan dalam bentuk matriks interval berukuran  $2 \times 7$  dan  $5 \times 7$  sebagai berikut :

**Contoh 4.4**

Tentukan determinan dari matriks interval persegi panjang  $2 \times 7$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengemukakan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$A = \begin{bmatrix} [0, 1] & [1, 3] & [2, 3] & [1, 2] & [0, 1] & [-1, 0] & [2, 4] \\ [2, 5] & [1, 2] & [-1, 0] & [1, 3] & [2, 3] & [-1, 1] & [1, 2] \end{bmatrix}!$$

**Penyelesaian :**

$$\begin{aligned} (-1)^{(1+2)+1} \left| A_1, \sum_{k=2}^7 (-1)^k A_k \right| &= (-1)^{(1+2)+1} |A_1, A_2 - A_3 + A_4 - A_5 + A_6 - A_7| \\ &= \begin{vmatrix} [0, 1] & [-7, 1] \\ [2, 5] & [-4, 4] \end{vmatrix} \end{aligned}$$

$$\begin{aligned} (-1)^{(1+2)+2} \left| A_2, \sum_{k=3}^7 (-1)^k A_k \right| &= (-1)^{(1+2)+2} |A_2, -A_3 + A_4 - A_5 + A_6 - A_7| \\ &= - \begin{vmatrix} [1, 3] & [-8, -2] \\ [1, 2] & [-5, 2] \end{vmatrix} \end{aligned}$$

$$\begin{aligned} (-1)^{(1+2)+3} \left| A_3, \sum_{k=4}^7 (-1)^k A_k \right| &= (-1)^{(1+2)+3} |A_3, A_4 - A_5 + A_6 - A_7| \\ &= \begin{vmatrix} [2, 3] & [-5, 0] \\ [-1, 0] & [-5, 1] \end{vmatrix} \end{aligned}$$

$$\begin{aligned} (-1)^{(1+2)+4} \left| A_4, \sum_{k=5}^7 (-1)^k A_k \right| &= (-1)^{(1+2)+4} |A_4, -A_5 + A_6 - A_7| \\ &= - \begin{vmatrix} [1, 2] & [-6, -2] \\ [1, 3] & [-6, -2] \end{vmatrix} \end{aligned}$$

$$(-1)^{(1+2)+5} \left| A_5, \sum_{k=6}^7 (-1)^k A_k \right| = (-1)^{(1+2)+5} |A_5, A_6 - A_7| = \begin{vmatrix} [0, 1] & [-5, -2] \\ [2, 3] & [-3, 0] \end{vmatrix}$$

$$(-1)^{(1+2)+6} \left| A_6, \sum_{k=7}^7 (-1)^k A_k \right| = (-1)^{(1+2)+6} |A_6, -A_7| = - \begin{vmatrix} [-1, 0] & [-4, -2] \\ [-1, 1] & [-2, -1] \end{vmatrix}$$

sehingga

$$\begin{aligned} |A| &= \begin{vmatrix} [0, 1] & [-7, 1] \\ [2, 5] & [-4, 4] \end{vmatrix} - \begin{vmatrix} [1, 3] & [-8, -2] \\ [1, 2] & [-5, 2] \end{vmatrix} + \begin{vmatrix} [2, 3] & [-5, 0] \\ [-1, 0] & [-5, 1] \end{vmatrix} \\ &\quad - \begin{vmatrix} [1, 2] & [-6, -2] \\ [1, 3] & [-6, -2] \end{vmatrix} + \begin{vmatrix} [0, 1] & [-5, -2] \\ [2, 3] & [-3, 0] \end{vmatrix} - \begin{vmatrix} [-1, 0] & [-4, -2] \\ [-1, 1] & [-2, -1] \end{vmatrix} \\ &= ([-4, 4] - [-35, 5]) - ([-15, 6] - [-16, -2]) + ([-15, 3] - [0, 5]) \\ &\quad - ([-12, -2] - [-18, -2]) + ([-3, 0] - [-15, -4]) - ([0, 2] - [-4, 4]) \\ &= ([-9, 39]) - ([-13, 22]) + ([-20, 3]) - ([-10, 16]) + ([1, 15]) \\ &\quad - ([-4, 6]) \\ &= [-72, 84] \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

**Contoh 4.5 :**

Diberikan matriks interval persegi panjang  $5 \times 7$  sebagai berikut :

$$A = \begin{bmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [2, 3] & [0, 3] & [0, 2] \\ [0, 1] & [1, 3] & [0, 2] & [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{bmatrix}$$

Tentukan determinan dari matriks !

**Penyelesaian :**

$$\begin{aligned} & (-1)^{(1+2+3+4+5)+1+2+3+4} \left| A_1, A_2, A_3, A_4, \sum_{k=5}^7 (-1)^k A_k \right| \\ &= (-1)^{(1+2+3+4+5)+1+2+3+4} |A_1, A_2, A_3, A_4, -A_5 + A_6 - A_7| \\ &= - \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [-5, 1] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [-2, 3] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] & [-3, 2] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [-5, -2] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [-3, 1] \end{vmatrix} \\ & (-1)^{(1+2+3+4+5)+1+2+3+5} \left| A_1, A_2, A_3, A_5, \sum_{k=6}^7 (-1)^k A_k \right| \\ &= (-1)^{(1+2+3+4+5)+1+2+3+5} |A_1, A_2, A_3, A_5, A_6 - A_7| \\ &= \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [2, 3] & [-2, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [0, 3] & [1, 3] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] & [-1, 2] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] & [-4, -2] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] & [0, 3] \end{vmatrix} \\ & (-1)^{(1+2+3+4+5)+1+2+3+6} \left| A_1, A_2, A_3, A_6, \sum_{k=7}^7 (-1)^k A_k \right| \\ &= (-1)^{(1+2+3+4+5)+1+2+3+6} |A_1, A_2, A_3, A_6, -A_7| \\ &= - \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [0, 3] & [-2, 0] \\ [-1, 1] & [1, 3] & [0, 2] & [1, 2] & [0, 1] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] & [-3, -2] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] & [-1, 0] \end{vmatrix} \\ & (-1)^{(1+2+3+4+5)+1+3+4+5} \left| A_1, A_3, A_4, A_5, \sum_{k=6}^7 (-1)^k A_k \right| \\ &= (-1)^{(1+2+3+4+5)+1+3+4+5} |A_1, A_3, A_4, A_5, A_6 - A_7| \end{aligned}$$

$$\begin{vmatrix} [1, 2] & [-1, 0] & [1, 3] & [2, 3] & [-2, 3] \\ [-1, 1] & [0, 2] & [-1, 1] & [0, 3] & [1, 3] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 2] & [-1, 2] \\ [0, 1] & [1, 2] & [-1, 1] & [0, 1] & [-4, -2] \\ [0, 3] & [0, 2] & [0, 3] & [2, 3] & [0, 3] \end{vmatrix}$$

$$(-1)^{(1+2+3+4+5)+1+3+4+6} |A_1, A_3, A_4, A_6, \sum_{k=7}^7 (-1)^k A_k|$$

$$= (-1)^{(1+2+3+4+5)+1+3+4+6} |A_1, A_3, A_4, A_6, -A_7|$$

$$= - \begin{vmatrix} [1, 2] & [-1, 0] & [1, 3] & [0, 3] & [-2, 0] \\ [-1, 1] & [0, 2] & [-1, 1] & [1, 2] & [0, 1] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [-1, 0] & [-3, -2] \\ [0, 3] & [0, 2] & [0, 3] & [1, 3] & [-1, 0] \end{vmatrix}$$

$$(-1)^{(1+2+3+4+5)+1+4+5+6} |A_1, A_4, A_5, A_6, \sum_{k=7}^7 (-1)^k A_k|$$

$$= (-1)^{(1+2+3+4+5)+1+4+5+6} |A_1, A_4, A_5, A_6, -A_7|$$

$$= - \begin{vmatrix} [1, 2] & [1, 3] & [2, 3] & [0, 3] & [-2, 0] \\ [-1, 1] & [-1, 1] & [0, 3] & [1, 2] & [0, 1] \\ [2, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-1, 0] & [-3, -2] \\ [0, 3] & [0, 3] & [2, 3] & [1, 3] & [-1, 0] \end{vmatrix}$$

$$(-1)^{(1+2+3+4+5)+2+3+4+5} |A_2, A_3, A_4, A_5, \sum_{k=6}^7 (-1)^k A_k|$$

$$= (-1)^{(1+2+3+4+5)+2+3+4+5} |A_2, A_3, A_4, A_5, A_6 - A_7|$$

$$= - \begin{vmatrix} [0, 1] & [-1, 0] & [1, 3] & [2, 3] & [-2, 3] \\ [1, 3] & [0, 2] & [-1, 1] & [0, 3] & [1, 3] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 2] & [-1, 2] \\ [1, 3] & [1, 2] & [-1, 1] & [0, 1] & [-4, -2] \\ [1, 2] & [0, 2] & [0, 3] & [2, 3] & [0, 3] \end{vmatrix}$$

$$(-1)^{(1+2+3+4+5)+2+3+4+6} |A_2, A_3, A_4, A_6, \sum_{k=7}^7 (-1)^k A_k|$$

$$= (-1)^{(1+2+3+4+5)+2+3+4+6} |A_2, A_3, A_4, A_6, -A_7|$$

$$= - \begin{vmatrix} [0, 1] & [-1, 0] & [1, 3] & [0, 3] & [-2, 0] \\ [1, 3] & [0, 2] & [-1, 1] & [1, 2] & [0, 1] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [-1, 0] & [-3, -2] \\ [1, 2] & [0, 2] & [0, 3] & [1, 3] & [-1, 0] \end{vmatrix}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.

b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengemukakan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & (-1)^{(1+2+3+4+5)+3+4+5+6} \left| A_3, A_4, A_5, A_6, \sum_{k=7}^7 (-1)^k A_k \right| \\
 &= (-1)^{(1+2+3+4+5)+3+4+5+6} |A_3, A_4, A_5, A_6, -A_7| \\
 &= - \begin{vmatrix} [-1, 0] & [1, 3] & [2, 3] & [0, 3] & [-2, 0] \\ [0, 2] & [-1, 1] & [0, 3] & [1, 2] & [0, 1] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] & [-3, -2] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] & [-1, 0] \end{vmatrix}
 \end{aligned}$$

Sehingga:

$$\begin{aligned}
 |A| &= - \left( [1, 2] \begin{bmatrix} [1, 3] & [0, 2] & [-1, 1] & [-2, 3] \\ [1, 2] & [1, 3] & [-1, 0] & [-3, 2] \\ [1, 3] & [1, 2] & [-1, 1] & [-5, -2] \\ [1, 2] & [0, 2] & [0, 3] & [-3, 1] \end{bmatrix} \right. \\
 &\quad - [0, 1] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [-2, 3] \\ [2, 3] & [1, 3] & [-1, 0] & [-3, 2] \\ [0, 1] & [1, 2] & [-1, 1] & [-5, -2] \\ [0, 3] & [0, 2] & [0, 3] & [-3, 1] \end{bmatrix} \\
 &\quad + [-1, 0] \begin{bmatrix} [-1, 1] & [1, 3] & [-1, 1] & [-2, 3] \\ [2, 3] & [1, 2] & [-1, 0] & [-3, 2] \\ [0, 1] & [1, 3] & [-1, 1] & [-5, -2] \\ [0, 3] & [1, 2] & [0, 3] & [-3, 1] \end{bmatrix} \\
 &\quad - [1, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [-2, 3] \\ [2, 3] & [1, 2] & [1, 3] & [-3, 2] \\ [0, 1] & [1, 3] & [1, 2] & [-5, -2] \\ [0, 3] & [1, 2] & [0, 2] & [-3, 1] \end{bmatrix} \\
 &\quad \left. + [-5, 1] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 1] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] \end{bmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \left( [1, 2] \begin{bmatrix} [1, 3] & [0, 2] & [0, 3] & [1, 3] \\ [1, 2] & [1, 3] & [0, 2] & [-1, 2] \\ [1, 3] & [1, 2] & [0, 1] & [-4, -2] \\ [1, 2] & [0, 2] & [2, 3] & [0, 3] \end{bmatrix} \right. \\
 & - [0, 1] \begin{bmatrix} [-1, 1] & [0, 2] & [0, 3] & [1, 3] \\ [2, 3] & [1, 3] & [0, 2] & [-1, 2] \\ [0, 1] & [1, 2] & [0, 1] & [-4, -2] \\ [0, 3] & [0, 2] & [2, 3] & [0, 3] \end{bmatrix} \\
 & + [-1, 0] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 3] & [1, 3] \\ [2, 3] & [1, 2] & [0, 2] & [-1, 2] \\ [0, 1] & [1, 3] & [0, 1] & [-4, -2] \\ [0, 3] & [1, 2] & [2, 3] & [0, 3] \end{bmatrix} \\
 & - [1, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [1, 3] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 2] \\ [0, 1] & [1, 3] & [1, 2] & [-4, -2] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] \end{bmatrix} \\
 & \left. + [-2, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] \end{bmatrix} \right) \\
 & - \left( [1, 2] \begin{bmatrix} [1, 3] & [0, 2] & [1, 2] & [0, 1] \\ [1, 2] & [1, 3] & [0, 1] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 0] & [-3, -2] \\ [1, 2] & [0, 2] & [1, 3] & [-1, 0] \end{bmatrix} \right. \\
 & - [0, 1] \begin{bmatrix} [-1, 1] & [0, 2] & [1, 2] & [0, 1] \\ [2, 3] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 0] & [-3, -2] \\ [0, 3] & [0, 2] & [1, 3] & [-1, 0] \end{bmatrix} \\
 & + [-1, 0] \begin{bmatrix} [-1, 1] & [1, 3] & [1, 2] & [0, 1] \\ [2, 3] & [1, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [-1, 0] & [-3, -2] \\ [0, 3] & [1, 2] & [1, 3] & [-1, 0] \end{bmatrix} \\
 & - [0, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 1] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-3, -2] \\ [0, 3] & [1, 2] & [0, 2] & [-1, 0] \end{bmatrix} \\
 & \left. + [-2, 3] \begin{bmatrix} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] \end{bmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \begin{pmatrix} [1, 2] \begin{bmatrix} [0, 2] & [-1, 1] & [0, 3] & [1, 3] \\ [1, 3] & [-1, 0] & [0, 2] & [-1, 2] \\ [1, 2] & [-1, 1] & [0, 1] & [-4, -2] \\ [0, 2] & [0, 3] & [2, 3] & [0, 3] \end{bmatrix} \\ - [-1, 0] \begin{bmatrix} [-1, 1] & [-1, 1] & [0, 3] & [1, 3] \\ [2, 3] & [-1, 0] & [0, 2] & [-1, 2] \\ [0, 1] & [-1, 1] & [0, 1] & [-4, -2] \\ [0, 3] & [0, 3] & [2, 3] & [0, 3] \end{bmatrix} \\ + [1, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [0, 3] & [1, 3] \\ [2, 3] & [1, 3] & [0, 2] & [-1, 2] \\ [0, 1] & [1, 2] & [0, 1] & [-4, -2] \\ [0, 3] & [0, 2] & [2, 3] & [0, 3] \end{bmatrix} \\ - [2, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [1, 3] \\ [2, 3] & [1, 3] & [-1, 0] & [-1, 2] \\ [0, 1] & [1, 2] & [-1, 1] & [-4, -2] \\ [0, 3] & [0, 2] & [0, 3] & [0, 3] \end{bmatrix} \\ + [-2, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [0, 2] & [0, 3] & [2, 3] \end{bmatrix} \end{pmatrix} \\
 & - \begin{pmatrix} [1, 2] \begin{bmatrix} [0, 2] & [-1, 1] & [1, 2] & [0, 1] \\ [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [-1, 0] & [-3, -2] \\ [0, 2] & [0, 3] & [1, 3] & [-1, 0] \end{bmatrix} \\ - [-1, 0] \begin{bmatrix} [-1, 1] & [-1, 1] & [1, 2] & [0, 1] \\ [2, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 1] & [-1, 0] & [-3, -2] \\ [0, 3] & [0, 3] & [1, 3] & [-1, 0] \end{bmatrix} \\ + [1, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [1, 2] & [0, 1] \\ [2, 3] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 0] & [-3, -2] \\ [0, 3] & [0, 2] & [1, 3] & [-1, 0] \end{bmatrix} \\ - [0, 3] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [0, 1] \\ [2, 3] & [1, 3] & [-1, 0] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [-3, -2] \\ [0, 3] & [0, 2] & [0, 3] & [-1, 0] \end{bmatrix} \\ + [-2, 0] \begin{bmatrix} [-1, 1] & [0, 2] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [0, 3] & [1, 3] \end{bmatrix} \end{pmatrix}
 \end{aligned}$$



Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & - \left( [1, 2] \begin{bmatrix} [-1, 1] & [0, 3] & [1, 2] & [0, 1] \\ [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [-1, 1] & [0, 1] & [-1, 0] & [-3, -2] \\ [0, 3] & [2, 3] & [1, 3] & [-1, 0] \end{bmatrix} \right. \\
 & \quad - [1, 3] \begin{bmatrix} [-1, 1] & [0, 3] & [1, 2] & [0, 1] \\ [2, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [0, 1] & [-1, 0] & [-3, -2] \\ [0, 3] & [2, 3] & [1, 3] & [-1, 0] \end{bmatrix} \\
 & \quad + [2, 3] \begin{bmatrix} [-1, 1] & [-1, 1] & [1, 2] & [0, 1] \\ [2, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 1] & [-1, 0] & [-3, -2] \\ [0, 3] & [0, 3] & [1, 3] & [-1, 0] \end{bmatrix} \\
 & \quad - [0, 3] \begin{bmatrix} [-1, 1] & [-1, 1] & [0, 3] & [0, 1] \\ [2, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-3, -2] \\ [0, 3] & [0, 3] & [2, 3] & [-1, 0] \end{bmatrix} \\
 & \quad \left. + [-2, 0] \begin{bmatrix} [-1, 1] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 3] & [2, 3] & [1, 3] \end{bmatrix} \right) \\
 & - \left( [0, 1] \begin{bmatrix} [0, 2] & [-1, 1] & [0, 3] & [1, 3] \\ [1, 3] & [-1, 0] & [0, 2] & [-1, 2] \\ [1, 2] & [-1, 1] & [0, 1] & [-4, -2] \\ [0, 2] & [0, 3] & [2, 3] & [0, 3] \end{bmatrix} \right. \\
 & \quad - [-1, 0] \begin{bmatrix} [1, 3] & [-1, 1] & [0, 3] & [1, 3] \\ [1, 2] & [-1, 0] & [0, 2] & [-1, 2] \\ [1, 3] & [-1, 1] & [0, 1] & [-4, -2] \\ [1, 2] & [0, 3] & [2, 3] & [0, 3] \end{bmatrix} \\
 & \quad + [1, 3] \begin{bmatrix} [1, 3] & [0, 2] & [0, 3] & [1, 3] \\ [1, 2] & [1, 3] & [0, 2] & [-1, 2] \\ [1, 3] & [1, 2] & [0, 1] & [-4, -2] \\ [1, 2] & [0, 2] & [2, 3] & [0, 3] \end{bmatrix} \\
 & \quad - [2, 3] \begin{bmatrix} [1, 3] & [0, 2] & [-1, 1] & [1, 3] \\ [1, 2] & [1, 3] & [-1, 0] & [-1, 2] \\ [1, 3] & [1, 2] & [-1, 1] & [-4, -2] \\ [1, 2] & [0, 2] & [0, 3] & [0, 3] \end{bmatrix} \\
 & \quad \left. + [-2, 3] \begin{bmatrix} [1, 3] & [0, 2] & [-1, 1] & [0, 3] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 2] \\ [1, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [1, 2] & [0, 2] & [0, 3] & [2, 3] \end{bmatrix} \right)
 \end{aligned}$$

**Hak Cipta Dilindungi Undang-Undang**

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \begin{pmatrix} [0, 2] & [-1, 1] & [1, 2] & [0, 1] \\ [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [-1, 0] & [-3, -2] \\ [0, 2] & [0, 3] & [1, 3] & [-1, 0] \end{pmatrix} \\
 & - [-1, 0] \begin{pmatrix} [1, 3] & [-1, 1] & [1, 2] & [0, 1] \\ [1, 2] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 3] & [-1, 1] & [-1, 0] & [-3, -2] \\ [1, 2] & [0, 3] & [1, 3] & [-1, 0] \end{pmatrix} \\
 & + [1, 3] \begin{pmatrix} [1, 3] & [0, 2] & [1, 2] & [0, 1] \\ [1, 2] & [1, 3] & [0, 1] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 0] & [-3, -2] \\ [1, 2] & [0, 2] & [1, 3] & [-1, 0] \end{pmatrix} \\
 & - [2, 3] \begin{pmatrix} [1, 3] & [0, 2] & [-1, 1] & [0, 1] \\ [1, 2] & [1, 3] & [-1, 0] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [-3, -2] \\ [1, 2] & [0, 2] & [0, 3] & [-1, 0] \end{pmatrix} \\
 & + [-2, 0] \begin{pmatrix} [1, 3] & [0, 2] & [-1, 1] & [1, 2] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [0, 3] & [1, 3] \end{pmatrix} \Bigg) \\
 & - \begin{pmatrix} [-1, 1] & [0, 3] & [1, 2] & [0, 1] \\ [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [-1, 1] & [0, 1] & [-1, 0] & [-3, -2] \\ [0, 3] & [2, 3] & [1, 3] & [-1, 0] \end{pmatrix} \\
 & - [1, 3] \begin{pmatrix} [0, 2] & [0, 3] & [1, 2] & [0, 1] \\ [1, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 2] & [0, 1] & [-1, 0] & [-3, -2] \\ [0, 2] & [2, 3] & [1, 3] & [-1, 0] \end{pmatrix} \\
 & + [2, 3] \begin{pmatrix} [0, 2] & [-1, 1] & [1, 2] & [0, 1] \\ [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [-1, 0] & [-3, -2] \\ [0, 2] & [0, 3] & [1, 3] & [-1, 0] \end{pmatrix} \\
 & - [0, 3] \begin{pmatrix} [0, 2] & [-1, 1] & [0, 3] & [0, 1] \\ [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-3, -2] \\ [0, 2] & [0, 3] & [2, 3] & [-1, 0] \end{pmatrix} \\
 & + [-2, 0] \begin{pmatrix} [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{pmatrix} \Bigg)
 \end{aligned}$$

dengan menggunakan ekspansi kofaktor diperoleh hasil :

$$\begin{aligned}
 & = -([1, 2][-409, 527] - [0, 1][-440, 297] + [-1, 0][-533, 293] \\
 & \quad - [1, 3][-487, 582] + [-5, 1][-242, 259])
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 &+([1, 2][-465, 502] - [0, 1][-393, 352] + [-1, 0][-468, 513] \\
 &\quad - [1, 3][-521, 515] + [-2, 3][-443, 344]) \\
 &-([1, 2][-180, 230] - [0, 1][-177, 133] + [-1, 0][-234, 122] \\
 &\quad - [0, 3][-224, 189] + [-2, 3][-194, 262]) \\
 &+([1, 2][-321, 372] - [-1, 0][-225, 315] + [1, 3][-375, 296] \\
 &\quad - [2, 3][-318, 291] + [-2, 3][-220, 253]) \\
 &-([1, 2][-143, 147] - [-1, 0][-112, 164] + [1, 3][-180, 130] \\
 &\quad - [0, 3][-190, 129] + [-2, 0][-189, 171]) \\
 &-([1, 2][-124, 113] - [1, 3][-224, 111] + [2, 3][-112, 164] \\
 &\quad - [0, 3][-119, 227] + [-2, 0][-129, 189]) \\
 &-([0, 1][-321, 372] - [-1, 0][-340, 339] + [1, 3][-411, 502] \\
 &\quad - [2, 3][-326, 406] + [-2, 3][-253, 268]) \\
 &+([0, 1][-143, 147] - [-1, 0][-170, 135] + [1, 3][-190, 230] \\
 &\quad - [2, 3][-196, 204] + [-2, 0][-189, 213]) \\
 &-([-1, 0][-138, 165] - [1, 3][-178, 208] + [2, 3][-143, 147] \\
 &\quad - [0, 3][-170, 201] + [-2, 0][-183, 185]) \\
 &= -([-818, 1054] - [-440, 297] + [-293, 533] - [-1461, 1746] \\
 &\quad + [-1295, 1210]) \\
 &+([-930, 1004] - [-393, 352] + [-513, 468] - [-1563, 1545] \\
 &\quad + [-1329, 1032]) \\
 &-([-360, 460] - [-177, 133] + [-122, 234] - [-672, 567] + [-582, 786]) \\
 &+([-642, 744] - [-315, 225] + [-1125, 888] - [-954, 873] + [-660, 759]) \\
 &-([-286, 294] - [-164, 112] + [-540, 390] - [-570, 387] + [-378, 258]) \\
 &-([-248, 226] - [-672, 333] + [-336, 492] - [-357, 681] + [-258, 378]) \\
 &-([-321, 372] - [-339, 340] + [-1233, 1506] - [-978, 1218] + [-759, 804]) \\
 &+([-143, 147] - [-135, 170] + [-670, 690] - [-588, 612] + [-426, 378]) \\
 &-([-165, 138] - [-534, 624] + [-429, 441] - [-510, 603] + [-370, 366]) \\
 &= -([-4449, 4696]) + ([-4642, 4460]) - ([-1764, 2329]) + ([-3525, 3660]) \\
 &-([-1703, 1676]) - ([-1856, 2125]) - ([-3871, 3999]) + ([-2021, 1938]) \\
 &-([-2191, 1989]) \\
 &= [-27002, 25892]
 \end{aligned}$$

Pada Contoh 4.1 dan 4.4 diperoleh hasil yang berbeda dengan matriks yang sama. Begitu juga dengan Contoh 4.2 dan 4.5 diperoleh hasil yang berbeda

dengan matriks yang sama, sehingga disimpulkan bahwa Teorema 2.2 tidak berlaku untuk matriks interval.

Selanjutnya diberikan contoh Teorema 2.3 yang akan diaplikasikan dalam bentuk matriks interval persegi panjang  $2 \times 7$  dan  $5 \times 7$  sebagai berikut :

**Contoh 4.6 :**

Tentukan determinan dari matriks interval persegi panjang  $2 \times 7$  berikut !

$$A = \begin{bmatrix} [0, 1] & [1, 3] & [2, 3] & [1, 2] & [0, 1] & [-1, 0] & [2, 4] \\ [2, 5] & [1, 2] & [-1, 0] & [1, 3] & [2, 3] & [-1, 1] & [1, 2] \end{bmatrix}$$

**Penyelesaian :**

$$(-1)^{(1+2)+2} \left| \sum_{k=1}^1 (-1)^k A_k, A_2 \right| = (-1)^{(1+2)+2} |-A_1, A_2| = - \begin{vmatrix} [-1, 0] & [1, 3] \\ [-5, -2] & [1, 2] \end{vmatrix}$$

$$(-1)^{(1+2)+3} \left| \sum_{k=1}^2 (-1)^k A_k, A_3 \right| = (-1)^{(1+2)+3} |-A_1 + A_2, A_3| = \begin{vmatrix} [0, 3] & [2, 3] \\ [-4, 0] & [-1, 0] \end{vmatrix}$$

$$\begin{aligned} (-1)^{(1+2)+4} \left| \sum_{k=1}^3 (-1)^k A_k, A_4 \right| &= (-1)^{(1+2)+4} |-A_1 + A_2 - A_3, A_4| \\ &= - \begin{vmatrix} [-3, 1] & [1, 2] \\ [-4, 1] & [1, 3] \end{vmatrix} \end{aligned}$$

$$\begin{aligned} (-1)^{(1+2)+5} \left| \sum_{k=1}^4 (-1)^k A_k, A_5 \right| &= (-1)^{(1+2)+5} |-A_1 + A_2 - A_3 + A_4, A_5| \\ &= \begin{vmatrix} [-2, 3] & [0, 1] \\ [-3, 4] & [2, 3] \end{vmatrix} \end{aligned}$$

$$\begin{aligned} (-1)^{(1+2)+6} \left| \sum_{k=1}^5 (-1)^k A_k, A_6 \right| &= (-1)^{(1+2)+6} |-A_1 + A_2 - A_3 + A_4 - A_5, A_6| \\ &= - \begin{vmatrix} [-3, 3] & [-1, 0] \\ [-6, 2] & [-1, 1] \end{vmatrix} \end{aligned}$$

$$\begin{aligned} (-1)^{(1+2)+7} \left| \sum_{k=1}^6 (-1)^k A_k, A_7 \right| &= (-1)^{(1+2)+7} |-A_1 + A_2 - A_3 + A_4 - A_5 + A_6, A_7| \\ &= \begin{vmatrix} [-4, 3] & [2, 4] \\ [-7, 3] & [1, 2] \end{vmatrix} \end{aligned}$$

sehingga

$$|A| = - \begin{vmatrix} [-1, 0] & [1, 3] \\ [-5, -2] & [1, 2] \end{vmatrix} + \begin{vmatrix} [0, 3] & [2, 3] \\ [-4, 0] & [-1, 0] \end{vmatrix} - \begin{vmatrix} [-3, 1] & [1, 2] \\ [-4, 1] & [1, 3] \end{vmatrix}$$

Hak Cipta Dilindungi Undang-Undang  
 1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:  
 a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.  
 b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.  
 2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

- Hak Cipta Dilindungi Undang-Undang
1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
    - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
    - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
  2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \begin{vmatrix} [-2, 3] & [0, 1] \\ [-3, 4] & [2, 3] \end{vmatrix} - \begin{vmatrix} [-3, 3] & [-1, 0] \\ [-6, 2] & [-1, 1] \end{vmatrix} + \begin{vmatrix} [-4, 3] & [2, 4] \\ [-7, 3] & [1, 2] \end{vmatrix} \\
 & = -([-2, 0] - [-15, -2]) + ([-3, 0] - [-12, 0]) - ([-9, 3] - [-8, 2]) \\
 & \quad + ([-6, 9] - [-3, 4]) - ([-3, 3] - [-2, 6]) + ([-8, 6] - [-28, 12]) \\
 & = -[0, 15] + [-3, 12] - [-11, 11] + [-10, 12] - [-9, 5] + [-20, 34] \\
 & = [-64, 78]
 \end{aligned}$$

#### Contoh 4.7 :

Hitunglah determinan matriks interval persegi panjang  $5 \times 7$  sebagai berikut !

$$\mathbf{A} = \begin{bmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [2, 3] & [0, 3] & [0, 2] \\ [0, 1] & [1, 3] & [0, 2] & [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{bmatrix}$$

Penyelesaian :

$$\begin{aligned}
 & (-1)^{(1+2+3+4+5)+(2+3+4+5)} \left| \sum_{k=1}^1 (-1)^k A_{k, A_2, A_3, A_4, A_5} \right| \\
 & = (-1)^{(1+2+3+4+5)+(2+3+4+5)} |-A_1, A_2, A_3, A_4, A_5| \\
 & = - \begin{vmatrix} [-2, -1] & [0, 1] & [-1, 0] & [1, 3] & [2, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [0, 3] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 0] & [0, 2] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \\
 & = (-1)^{(1+2+3+4+5)+(2+3+4+6)} \left| \sum_{k=1}^1 (-1)^k A_{k, A_2, A_3, A_4, A_6} \right| \\
 & = (-1)^{(1+2+3+4+5)+(2+3+4+6)} |-A_1, A_2, A_3, A_4, A_6| \\
 & = \begin{vmatrix} [-2, -1] & [0, 1] & [-1, 0] & [1, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [1, 2] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 0] & [0, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix} \\
 & = (-1)^{(1+2+3+4+5)+(2+3+4+7)} \left| \sum_{k=1}^1 (-1)^k A_{k, A_2, A_3, A_4, A_7} \right| \\
 & = (-1)^{(1+2+3+4+5)+(2+3+4+7)} |-A_1, A_2, A_3, A_4, A_7|
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengemukakan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$= \begin{vmatrix} [-2, -1] & [0, 1] & [-1, 0] & [1, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [-1, 0] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 0] & [-1, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 1] & [2, 3] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 3] & [0, 1] \end{vmatrix}$$

$$= (-1)^{(1+2+3+4+5)+(2+3+5+6)} \left| \sum_{k=1}^1 (-1)^k A_{k, A_2, A_3, A_5, A_6} \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+3+5+6)} |-A_1, A_2, A_3, A_5, A_6|$$

$$= \begin{vmatrix} [-2, -1] & [0, 1] & [-1, 0] & [2, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [0, 3] & [1, 2] \\ [-3, -2] & [1, 2] & [1, 3] & [0, 2] & [0, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [-3, 0] & [1, 2] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix}$$

$$= (-1)^{(1+2+3+4+5)+(2+3+5+7)} \left| \sum_{k=1}^1 (-1)^k A_{k, A_2, A_3, A_5, A_7} \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+3+5+7)} |-A_1, A_2, A_3, A_5, A_7|$$

$$= \begin{vmatrix} [-2, -1] & [0, 1] & [-1, 0] & [2, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [0, 3] & [-1, 0] \\ [-3, -2] & [1, 2] & [1, 3] & [0, 2] & [-1, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [0, 1] & [2, 3] \\ [-3, 0] & [1, 2] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix}$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+6)} \left| \sum_{k=1}^1 (-1)^k A_{k, A_2, A_4, A_5, A_6} \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+6)} |-A_1, A_2, A_4, A_5, A_6|$$

$$= \begin{vmatrix} [-2, -1] & [0, 1] & [1, 3] & [2, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [-3, -2] & [1, 2] & [-1, 0] & [0, 2] & [0, 1] \\ [-1, 0] & [1, 3] & [-1, 1] & [0, 1] & [-1, 0] \\ [-3, 0] & [1, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix}$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+7)} \left| \sum_{k=1}^1 (-1)^k A_{k, A_2, A_4, A_5, A_7} \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+7)} |-A_1, A_2, A_4, A_5, A_7|$$

$$= \begin{vmatrix} [-2, -1] & [0, 1] & [1, 3] & [2, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [-1, 1] & [0, 3] & [-1, 0] \\ [-3, -2] & [1, 2] & [-1, 0] & [0, 2] & [-1, 1] \\ [-1, 0] & [1, 3] & [-1, 1] & [0, 1] & [2, 3] \\ [-3, 0] & [1, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$(-1)^{(1+2+3+4+5)+(3+4+5+6)} \left| \sum_{k=1}^2 (-1)^k A_k, A_3, A_4, A_5, A_6 \right|$$

$$= (-1)^{(1+2+3+4+5)+(3+4+5+6)} |-A_1 + A_2, A_3, A_4, A_5, A_6|$$

$$= \begin{vmatrix} [-2, 0] & [-1, 0] & [1, 3] & [2, 3] & [0, 3] \\ [0, 4] & [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [-2, 0] & [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 3] & [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [-2, 2] & [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix}$$

$$(-1)^{(1+2+3+4+5)+(3+4+5+7)} \left| \sum_{k=1}^2 (-1)^k A_k, A_3, A_4, A_5, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(3+4+5+7)} |-A_1 + A_2, A_3, A_4, A_5, A_7|$$

$$= \begin{vmatrix} [-2, 0] & [-1, 0] & [1, 3] & [2, 3] & [0, 2] \\ [0, 4] & [0, 2] & [-1, 1] & [0, 3] & [-1, 0] \\ [-2, 0] & [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 3] & [1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [-2, 2] & [0, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix}$$

$$(-1)^{(1+2+3+4+5)+(4+5+6+7)} \left| \sum_{k=1}^3 (-1)^k A_k, A_4, A_5, A_6, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(4+5+6+7)} |-A_1 + A_2 - A_3, A_4, A_5, A_6, A_7|$$

$$= \begin{vmatrix} [-2, 1] & [1, 3] & [2, 3] & [0, 3] & [0, 2] \\ [-2, 4] & [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [-5, -1] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [-2, 2] & [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [-4, 2] & [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

Sehingga :

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 |A| &= - \begin{pmatrix} [-2, -1] \begin{vmatrix} [1, 3] & [0, 2] & [-1, 1] & [0, 3] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 2] \\ [1, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [1, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \\ - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [-1, 1] & [0, 3] \\ [-3, -2] & [1, 3] & [-1, 0] & [0, 2] \\ [-1, 0] & [1, 2] & [-1, 1] & [0, 1] \\ [-3, 0] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \\ + [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [-1, 1] & [0, 3] \\ [-3, -2] & [1, 2] & [-1, 0] & [0, 2] \\ [-1, 0] & [1, 3] & [-1, 1] & [0, 1] \\ [-3, 0] & [1, 2] & [0, 3] & [2, 3] \end{vmatrix} \\ - [1, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [-3, -2] & [1, 2] & [1, 3] & [0, 2] \\ [-1, 0] & [1, 3] & [1, 2] & [0, 1] \\ [-3, 0] & [1, 2] & [0, 2] & [2, 3] \end{vmatrix} \\ + [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 1] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 0] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 1] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 3] \end{vmatrix} \end{pmatrix} \\
 &+ \begin{pmatrix} [-2, -1] \begin{vmatrix} [1, 3] & [0, 2] & [-1, 1] & [1, 2] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix} \\ - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [-1, 1] & [1, 2] \\ [-3, -2] & [1, 3] & [-1, 0] & [0, 1] \\ [-1, 0] & [1, 2] & [-1, 1] & [-1, 0] \\ [-3, 0] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix} \\ + [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [-1, 1] & [1, 2] \\ [-3, -2] & [1, 2] & [-1, 0] & [0, 1] \\ [-1, 0] & [1, 3] & [-1, 1] & [-1, 0] \\ [-3, 0] & [1, 2] & [0, 3] & [1, 3] \end{vmatrix} \\ - [1, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [-3, -2] & [1, 2] & [1, 3] & [0, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 0] \\ [-3, 0] & [1, 2] & [0, 2] & [1, 3] \end{vmatrix} \\ + [0, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 1] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 0] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 1] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 3] \end{vmatrix} \end{pmatrix}
 \end{aligned}$$



Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & - \begin{pmatrix} [-2, -1] \left| \begin{array}{cccc} [1, 3] & [0, 2] & [-1, 1] & [-1, 0] \\ [1, 2] & [1, 3] & [-1, 0] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 1] & [2, 3] \\ [1, 2] & [0, 2] & [0, 3] & [0, 1] \end{array} \right| \\ & - [0, 1] \left| \begin{array}{cccc} [-1, 1] & [0, 2] & [-1, 1] & [-1, 0] \\ [-3, -2] & [1, 3] & [-1, 0] & [-1, 1] \\ [-1, 0] & [1, 2] & [-1, 1] & [2, 3] \\ [-3, 0] & [0, 2] & [0, 3] & [0, 1] \end{array} \right| \\ & + [-1, 0] \left| \begin{array}{cccc} [-1, 1] & [1, 3] & [-1, 1] & [-1, 0] \\ [-3, -2] & [1, 2] & [-1, 0] & [-1, 1] \\ [-1, 0] & [1, 3] & [-1, 1] & [2, 3] \\ [-3, 0] & [1, 2] & [0, 3] & [0, 1] \end{array} \right| \\ & - [1, 3] \left| \begin{array}{cccc} [-1, 1] & [1, 3] & [0, 2] & [-1, 0] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [2, 3] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 1] \end{array} \right| \\ & + [0, 2] \left| \begin{array}{cccc} [-1, 1] & [1, 3] & [0, 2] & [-1, 1] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 0] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 1] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 3] \end{array} \right| \end{pmatrix} \\
 & - \begin{pmatrix} [-2, -1] \left| \begin{array}{cccc} [1, 3] & [0, 2] & [0, 3] & [1, 2] \\ [1, 2] & [1, 3] & [0, 2] & [0, 1] \\ [1, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [2, 3] & [1, 3] \end{array} \right| \\ & - [0, 1] \left| \begin{array}{cccc} [-1, 1] & [0, 2] & [0, 3] & [1, 2] \\ [-3, -2] & [1, 3] & [0, 2] & [0, 1] \\ [-1, 0] & [1, 2] & [0, 1] & [-1, 0] \\ [-3, 0] & [0, 2] & [2, 3] & [1, 3] \end{array} \right| \\ & + [-1, 0] \left| \begin{array}{cccc} [-1, 1] & [1, 3] & [0, 3] & [1, 2] \\ [-3, -2] & [1, 2] & [0, 2] & [0, 1] \\ [-1, 0] & [1, 3] & [0, 1] & [-1, 0] \\ [-3, 0] & [1, 2] & [2, 3] & [1, 3] \end{array} \right| \\ & - [2, 3] \left| \begin{array}{cccc} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [-3, -2] & [1, 2] & [1, 3] & [0, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [-1, 0] \\ [-3, 0] & [1, 2] & [0, 2] & [1, 3] \end{array} \right| \\ & + [0, 3] \left| \begin{array}{cccc} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [-3, -2] & [1, 2] & [1, 3] & [0, 2] \\ [-1, 0] & [1, 3] & [1, 2] & [0, 1] \\ [-3, 0] & [1, 2] & [0, 2] & [2, 3] \end{array} \right| \end{pmatrix}
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \left( [-2, -1] \begin{vmatrix} [1, 3] & [0, 2] & [0, 3] & [-1, 0] \\ [1, 2] & [1, 3] & [0, 2] & [-1, 1] \\ [1, 3] & [1, 2] & [0, 1] & [2, 3] \\ [1, 2] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [0, 3] & [-1, 0] \\ [-3, -2] & [1, 3] & [0, 2] & [-1, 1] \\ [-1, 0] & [1, 2] & [0, 1] & [2, 3] \\ [-3, 0] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 3] & [-1, 0] \\ [-3, -2] & [1, 2] & [0, 2] & [-1, 1] \\ [-1, 0] & [1, 3] & [0, 1] & [2, 3] \\ [-3, 0] & [1, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 0] \\ [-3, -2] & [1, 2] & [1, 3] & [-1, 1] \\ [-1, 0] & [1, 3] & [1, 2] & [2, 3] \\ [-3, 0] & [1, 2] & [0, 2] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [-3, -2] & [1, 2] & [1, 3] & [0, 2] \\ [-1, 0] & [1, 3] & [1, 2] & [0, 1] \\ [-3, 0] & [1, 2] & [0, 2] & [2, 3] \end{vmatrix} \right) \\
 & + \left( [-2, -1] \begin{vmatrix} [1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 2] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 3] & [-1, 1] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \right. \\
 & \quad - [0, 1] \begin{vmatrix} [-1, 1] & [-1, 1] & [0, 3] & [1, 2] \\ [-3, -2] & [-1, 0] & [0, 2] & [0, 1] \\ [-1, 0] & [-1, 1] & [0, 1] & [-1, 0] \\ [-3, 0] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 3] & [1, 2] \\ [-3, -2] & [1, 2] & [0, 2] & [0, 1] \\ [-1, 0] & [1, 3] & [0, 1] & [-1, 0] \\ [-3, 0] & [1, 2] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [-1, 1] & [1, 2] \\ [-3, -2] & [1, 2] & [-1, 0] & [0, 1] \\ [-1, 0] & [1, 3] & [-1, 1] & [-1, 0] \\ [-3, 0] & [1, 2] & [0, 3] & [1, 3] \end{vmatrix} \\
 & \quad \left. + [0, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [-1, 1] & [0, 3] \\ [-3, -2] & [1, 2] & [-1, 0] & [0, 2] \\ [-1, 0] & [1, 3] & [-1, 1] & [0, 1] \\ [-3, 0] & [1, 2] & [0, 3] & [2, 3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & - \left( [-2, -1] \begin{vmatrix} [1, 3] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 2] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 3] & [-1, 1] & [0, 1] & [2, 3] \\ [1, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [0, 1] \begin{vmatrix} [-1, 1] & [-1, 1] & [0, 3] & [-1, 0] \\ [-3, -2] & [-1, 0] & [0, 2] & [-1, 1] \\ [-1, 0] & [-1, 1] & [0, 1] & [2, 3] \\ [-3, 0] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 3] & [-1, 0] \\ [-3, -2] & [1, 2] & [0, 2] & [-1, 1] \\ [-1, 0] & [1, 3] & [0, 1] & [2, 3] \\ [-3, 0] & [1, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [-1, 1] & [-1, 0] \\ [-3, -2] & [1, 2] & [-1, 0] & [-1, 1] \\ [-1, 0] & [1, 3] & [-1, 1] & [2, 3] \\ [-3, 0] & [1, 2] & [0, 3] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [-1, 1] & [1, 3] & [-1, 1] & [0, 3] \\ [-3, -2] & [1, 2] & [-1, 0] & [0, 2] \\ [-1, 0] & [1, 3] & [-1, 1] & [0, 1] \\ [-3, 0] & [1, 2] & [0, 3] & [2, 3] \end{vmatrix} \right) \\
 & - \left( [-2, 0] \begin{vmatrix} [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \right. \\
 & \quad - [-1, 0] \begin{vmatrix} [0, 4] & [-1, 1] & [0, 3] & [1, 2] \\ [-2, 0] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 3] & [-1, 1] & [0, 1] & [-1, 0] \\ [-2, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [0, 4] & [0, 2] & [0, 3] & [1, 2] \\ [-2, 0] & [1, 3] & [0, 2] & [0, 1] \\ [0, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [-2, 2] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [0, 4] & [0, 2] & [-1, 1] & [1, 2] \\ [-2, 0] & [1, 3] & [-1, 0] & [0, 1] \\ [0, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [-2, 2] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix} \\
 & \quad \left. + [0, 3] \begin{vmatrix} [0, 4] & [0, 2] & [-1, 1] & [0, 3] \\ [-2, 0] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [-2, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \begin{pmatrix} [-2, 0] \begin{vmatrix} [0, 2] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\ - [-1, 0] \begin{vmatrix} [0, 4] & [-1, 1] & [0, 3] & [-1, 0] \\ [-2, 0] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 3] & [-1, 1] & [0, 1] & [2, 3] \\ [-2, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\ + [1, 3] \begin{vmatrix} [0, 4] & [0, 2] & [0, 3] & [-1, 0] \\ [-2, 0] & [1, 3] & [0, 2] & [-1, 1] \\ [0, 3] & [1, 2] & [0, 1] & [2, 3] \\ [-2, 2] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \\ - [2, 3] \begin{vmatrix} [0, 4] & [0, 2] & [-1, 1] & [-1, 0] \\ [-2, 0] & [1, 3] & [-1, 0] & [-1, 1] \\ [0, 3] & [1, 2] & [-1, 1] & [2, 3] \\ [-2, 2] & [0, 2] & [0, 3] & [0, 1] \end{vmatrix} \\ + [0, 2] \begin{vmatrix} [0, 4] & [0, 2] & [-1, 1] & [0, 3] \\ [-2, 0] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [-2, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \end{pmatrix} \\
 & - \begin{pmatrix} [-2, 1] \begin{vmatrix} [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix} \\ - [1, 3] \begin{vmatrix} [-2, 4] & [0, 3] & [1, 2] & [-1, 0] \\ [-5, -1] & [0, 2] & [0, 1] & [-1, 1] \\ [-2, 2] & [0, 1] & [-1, 0] & [2, 3] \\ [-4, 2] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix} \\ + [2, 3] \begin{vmatrix} [-2, 4] & [-1, 1] & [1, 2] & [-1, 0] \\ [-5, -1] & [-1, 0] & [0, 1] & [-1, 1] \\ [-2, 2] & [-1, 1] & [-1, 0] & [2, 3] \\ [-4, 2] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix} \\ - [0, 3] \begin{vmatrix} [-2, 4] & [-1, 1] & [0, 3] & [-1, 0] \\ [-5, -1] & [-1, 0] & [0, 2] & [-1, 1] \\ [-2, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [-4, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\ + [0, 2] \begin{vmatrix} [-2, 4] & [-1, 1] & [0, 3] & [1, 2] \\ [-5, -1] & [-1, 0] & [0, 2] & [0, 1] \\ [-2, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [-4, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix} \end{pmatrix}
 \end{aligned}$$

dengan menggunakan ekspansi kofaktor di peroleh hasil :

**Hak Cipta Dilindungi Undang-Undang**

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 &= -([-2, -1][-253, 268] - [0, 1][-223, 238] + [-1, 0][-216, 264]) \\
 &\quad - [1, 3][-316, 302] + [2, 3][-253, 236]) \\
 &+ ([-2, -1][-189, 213] - [0, 1][-107, 156] + [-1, 0][-152, 262]) \\
 &\quad - [1, 3][-276, 204] + [0, 3][-253, 236]) \\
 &- ([-2, -1][-239, 220] - [0, 1][-192, 127] + [-1, 0][-196, 204]) \\
 &\quad - [1, 3][-201, 247] + [0, 2][-253, 236]) \\
 &- ([-2, -1][-250, 252] - [0, 1][-186, 212] + [-1, 0][-262, 210]) \\
 &\quad - [2, 3][-285, 204] + [0, 3][-316, 293]) \\
 &+ ([-2, -1][-242, 192] - [0, 1][-255, 172] + [-1, 0][-243, 176]) \\
 &\quad - [2, 3][-201, 247] + [0, 2][-316, 293]) \\
 &+ ([-2, -1][-158, 164] - [0, 1][-218, 140] + [1, 3][-262, 210]) \\
 &\quad - [2, 3][-163, 236] + [0, 3][-234, 225]) \\
 &- ([-2, -1][-238, 106] - [0, 1][-171, 219] + [1, 3][-243, 176]) \\
 &\quad - [2, 3][-183, 210] + [0, 2][-234, 225]) \\
 &- ([-2, 0][-173, 183] - [-1, 0][-314, 188] + [1, 3][-311, 322]) \\
 &\quad - [2, 3][-181, 327] + [0, 3][-273, 386]) \\
 &+ ([-2, 0][-261, 143] - [-1, 0][-250, 250] + [1, 3][-406, 264]) \\
 &\quad - [2, 3][-356, 161] + [0, 2][-273, 386]) \\
 &- ([-2, 1][-144, 126] - [1, 3][-424, 334] + [2, 3][-160, 353]) \\
 &\quad - [0, 3][-207, 493] + [0, 2][-348, 275]) \\
 &= -([-536, 506] - [-223, 238] + [-264, 216] - [-948, 906] + [-759, 708]) \\
 &+ ([-426, 378] - [-107, 156] + [-262, 152] - [-826, 612] + [-759, 708]) \\
 &- ([-440, 478] - [-192, 127] + [-204, 196] - [-603, 741] + [-506, 472]) \\
 &- ([-504, 500] - [-186, 212] + [-210, 262] - [-855, 612] + [-948, 879]) \\
 &+ ([-384, 484] - [-255, 172] + [-176, 243] - [-603, 741] + [-632, 586]) \\
 &+ ([-328, 316] - [-218, 140] + [-786, 630] - [-489, 708] + [-702, 675]) \\
 &- ([-212, 476] - [-171, 219] + [-729, 528] - [-549, 630] + [-468, 450]) \\
 &- ([-366, 346] - [-188, 314] + [-933, 966] - [-543, 981] + [-819, 1158]) \\
 &+ ([-286, 522] - [-250, 250] + [-1218, 792] - [-1068, 483] + [-546, 772]) \\
 &- ([-252, 288] - [-1272, 1002] + [-480, 1059] - [-621, 1479] + [-696, 550]) \\
 &= -([-2703, 2601]) + ([-2215, 2171]) - ([-2018, 1941]) - ([-2486, 2682]) \\
 &+ ([-2105, 2171]) + ([-2664, 2328]) - ([-2258, 2174]) - ([-3413, 3201]) \\
 &+ ([-2783, 3404]) - ([-3909, 3790])
 \end{aligned}$$

$$= [-26156, 26861]$$

Pada Contoh 4.1 dan 4.6 diperoleh hasil yang berbeda dengan matriks yang sama. Begitu juga dengan Contoh 4.2 dan 4.7 diperoleh hasil yang berbeda dengan matriks yang sama, sehingga disimpulkan bahwa Teorema 2.3 tidak berlaku untuk matriks interval.

Selanjutnya diberikan contoh Teorema 2.4 yang akan diaplikasikan dalam bentuk matriks interval persegi panjang  $5 \times 7$  sebagai berikut :

**Contoh 4.8 :**

Hitunglah determinan dari matriks interval persegi panjang  $5 \times 7$  berikut !

$$A = \begin{bmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [2, 3] & [0, 3] & [0, 2] \\ [0, 1] & [1, 3] & [0, 2] & [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{bmatrix}$$

**Penyelesaian :**

$$m = 5, n = 7, p \in \{2,3,4\}$$

untuk  $p = 2$

$$|A| = \sum_{\substack{1 \leq j_1 < \dots < j_{p-1} \\ j_{p+1} < \dots < j_m \leq n \\ j_{p+1} - j_{p-1} > 1}} (-1)^{r+j_1+j_2+\dots+j_{p-1}+j_{p+1}+\dots+j_m} \times \left| A_{j_1}, \dots, A_{j_{p-1}}, \sum_{k=j_{p-1}+1}^{j_{p+1}-1} (-1)^k A_k, A_{j_{p+1}}, \dots, A_{j_m} \right|$$

$$|A| = \sum_{\substack{1 \leq j_1 \\ j_3 < j_4 < j_5 \leq 7 \\ j_3 - j_1 > 1}} (-1)^{(1+2+3+4+5)+(j_1+j_3+j_4+j_5)} \left| A_{j_1}, \sum_{k=j_1+1}^{j_3-1} (-1)^k A_k, A_{j_3}, A_{j_4}, A_{j_5} \right|$$

Semua kemungkinan  $j_1, j_3, j_4$  dan  $j_5$  yang memenuhi  $1 \leq j_1, j_3 < j_4 < j_5 \leq 7$  dan  $j_3 - j_1 > 1$  adalah :

a.  $j_1 = 1, j_3 = 3, j_4 = 4, j_5 = 5$

$$(-1)^{(1+2+3+4+5)+(1+3+4+5)} \left| A_1, \sum_{k=2}^2 (-1)^k A_k, A_3, A_4, A_5 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+3+4+5)} |A_1, A_2, A_3, A_4, A_5|$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.

b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [2, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix}$$

b.  $j_1 = 1, j_3 = 3, j_4 = 4, j_5 = 6$

$$(-1)^{(1+2+3+4+5)+(1+3+4+6)} \left| A_1, \sum_{k=2}^2 (-1)^k A_k, A_3, A_4, A_6 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+3+4+6)} |A_1, A_2, A_3, A_4, A_6|$$

$$= - \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [1, 3] \end{vmatrix}$$

c.  $j_1 = 1, j_3 = 3, j_4 = 4, j_5 = 7$

$$(-1)^{(1+2+3+4+5)+(1+3+4+7)} \left| A_1, \sum_{k=2}^2 (-1)^k A_k, A_3, A_4, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+3+4+7)} |A_1, A_2, A_3, A_4, A_7|$$

$$= \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [1, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [-1, 1] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] & [0, 1] \end{vmatrix}$$

d.  $j_1 = 1, j_3 = 3, j_4 = 5, j_5 = 6$

$$(-1)^{(1+2+3+4+5)+(1+3+5+6)} \left| A_1, \sum_{k=2}^2 (-1)^k A_k, A_3, A_5, A_6 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+3+5+6)} |A_1, A_2, A_3, A_5, A_6|$$

$$= \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [2, 3] & [0, 3] \\ [-1, 1] & [1, 3] & [0, 2] & [0, 3] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix}$$

e.  $j_1 = 1, j_3 = 3, j_4 = 5, j_5 = 7$

$$(-1)^{(1+2+3+4+5)+(1+3+5+7)} \left| A_1, \sum_{k=2}^2 (-1)^k A_k, A_3, A_5, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+3+5+7)} |A_1, A_2, A_3, A_5, A_7|$$

- Hak Cipta Dilindungi Undang-Undang
1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
    - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
    - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
  2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$= - \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [2, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix}$$

$$f. \quad j_1 = 1, \quad j_3 = 3, \quad j_4 = 6, \quad j_5 = 7$$

$$= (-1)^{(1+2+3+4+5)+(1+3+5+7)} \left| A_1, \sum_{k=2}^2 (-1)^k A_k, A_3, A_6, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+3+5+7)} |A_1, A_2, A_3, A_6, A_7|$$

$$= \begin{vmatrix} [1, 2] & [0, 1] & [-1, 0] & [0, 3] & [0, 2] \\ [-1, 1] & [1, 3] & [0, 2] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] & [0, 1] \end{vmatrix}$$

$$g. \quad j_1 = 1, \quad j_3 = 4, \quad j_4 = 5, \quad j_5 = 6$$

$$= (-1)^{(1+2+3+4+5)+(1+4+5+6)} \left| A_1, \sum_{k=2}^3 (-1)^k A_k, A_4, A_5, A_6 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+4+5+6)} |A_1, A_2 - A_3, A_4, A_5, A_6|$$

$$= - \begin{vmatrix} [1, 2] & [0, 2] & [1, 3] & [2, 3] & [0, 3] \\ [-1, 1] & [-1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [-2, 1] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [-1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [-1, 2] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix}$$

$$h. \quad j_1 = 1, \quad j_3 = 4, \quad j_4 = 5, \quad j_5 = 7$$

$$= (-1)^{(1+2+3+4+5)+(1+4+5+7)} \left| A_1, \sum_{k=2}^3 (-1)^k A_k, A_4, A_5, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+4+5+7)} |A_1, A_2 - A_3, A_4, A_5, A_7|$$

$$= \begin{vmatrix} [1, 2] & [0, 2] & [1, 3] & [2, 3] & [0, 2] \\ [-1, 1] & [-1, 3] & [-1, 1] & [0, 3] & [-1, 0] \\ [2, 3] & [-2, 1] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [-1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 3] & [-1, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix}$$

$$i. \quad j_1 = 1, \quad j_3 = 4, \quad j_4 = 6, \quad j_5 = 7$$

$$= (-1)^{(1+2+3+4+5)+(1+4+6+7)} \left| A_1, \sum_{k=2}^3 (-1)^k A_k, A_4, A_6, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+4+6+7)} |A_1, A_2 - A_3, A_4, A_6, A_7|$$



Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.

b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$= - \begin{vmatrix} [1, 2] & [0, 2] & [1, 3] & [0, 3] & [0, 2] \\ [-1, 1] & [-1, 3] & [-1, 1] & [1, 2] & [-1, 0] \\ [2, 3] & [-2, 1] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 2] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [-1, 2] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

$$j. \quad j_1 = 1, \quad j_3 = 5, \quad j_4 = 6, \quad j_5 = 7$$

$$= (-1)^{(1+2+3+4+5)+(1+5+6+7)} \left| A_1, \sum_{k=2}^4 (-1)^k A_k, A_5, A_6, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(1+5+6+7)} |A_1, A_2 - A_3 + A_4, A_5, A_6, A_7|$$

$$= \begin{vmatrix} [1, 2] & [1, 5] & [2, 3] & [0, 3] & [0, 2] \\ [-1, 1] & [-2, 4] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [-3, 1] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [-2, 3] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [-1, 5] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

$$k. \quad j_1 = 2, \quad j_3 = 4, \quad j_4 = 5, \quad j_5 = 6$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+6)} \left| A_2, \sum_{k=3}^5 (-1)^k A_k, A_4, A_5, A_6 \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+6)} |A_2, -A_3, A_4, A_5, A_6|$$

$$= \begin{vmatrix} [0, 1] & [0, 1] & [1, 3] & [2, 3] & [0, 3] \\ [1, 3] & [-2, 0] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 2] & [-3, -1] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 3] & [-2, -1] & [-1, 1] & [0, 1] & [-1, 0] \\ [1, 2] & [-2, 0] & [0, 3] & [2, 3] & [1, 3] \end{vmatrix}$$

$$l. \quad j_1 = 2, \quad j_3 = 4, \quad j_4 = 5, \quad j_5 = 7$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+7)} \left| A_2, \sum_{k=3}^5 (-1)^k A_k, A_4, A_5, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+4+5+7)} |A_2, -A_3, A_4, A_5, A_7|$$

$$= - \begin{vmatrix} [0, 1] & [0, 1] & [1, 3] & [2, 3] & [0, 2] \\ [1, 3] & [-2, 0] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 2] & [-3, -1] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 3] & [-2, -1] & [-1, 1] & [0, 1] & [2, 3] \\ [1, 2] & [-2, 0] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix}$$

$$m. \quad j_1 = 2, \quad j_3 = 4, \quad j_4 = 6, \quad j_5 = 7$$

$$= (-1)^{(1+2+3+4+5)+(2+4+6+7)} \left| A_2, \sum_{k=3}^5 (-1)^k A_k, A_4, A_6, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+4+6+7)} |A_2, -A_3, A_4, A_6, A_7|$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{vmatrix} [0, 1] & [0, 1] & [1, 3] & [0, 3] & [0, 2] \\ [1, 3] & [-2, 0] & [-1, 1] & [1, 2] & [-1, 0] \\ [1, 2] & [-3, -1] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 3] & [-2, -1] & [-1, 1] & [-1, 0] & [2, 3] \\ [1, 2] & [-2, 0] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

n.  $j_1 = 2, j_3 = 5, j_4 = 6, j_5 = 7$

$$(-1)^{(1+2+3+4+5)+(2+5+6+7)} \left| A_2, \sum_{k=3}^4 (-1)^k A_k, A_5, A_6, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(2+5+6+7)} |A_2, -A_3 + A_4, A_5, A_6, A_7|$$

$$= - \begin{vmatrix} [0, 1] & [1, 4] & [2, 3] & [0, 3] & [0, 2] \\ [1, 3] & [-3, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [1, 2] & [-4, -1] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 3] & [-3, 0] & [0, 1] & [-1, 0] & [2, 3] \\ [1, 2] & [-2, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

o.  $j_1 = 3, j_3 = 5, j_4 = 6, j_5 = 7$

$$(-1)^{(1+2+3+4+5)+(3+5+6+7)} \left| A_3, \sum_{k=4}^4 (-1)^k A_k, A_5, A_6, A_7 \right|$$

$$= (-1)^{(1+2+3+4+5)+(3+5+6+7)} |A_3, A_4, A_5, A_6, A_7|$$

$$= \begin{vmatrix} [-1, 0] & [1, 3] & [2, 3] & [0, 3] & [0, 2] \\ [0, 2] & [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{vmatrix}$$

sehingga

$$|A| = \left( [1, 2] \begin{vmatrix} [1, 3] & [0, 2] & [-1, 1] & [0, 3] \\ [1, 2] & [1, 3] & [-1, 0] & [0, 2] \\ [1, 3] & [1, 2] & [-1, 1] & [0, 1] \\ [1, 2] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 3] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [0, 2] & [0, 3] & [2, 3] \end{vmatrix} \right.$$

$$+ [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [-1, 1] & [0, 3] \\ [2, 3] & [1, 2] & [-1, 0] & [0, 2] \\ [0, 1] & [1, 3] & [-1, 1] & [0, 1] \\ [0, 3] & [1, 2] & [0, 3] & [2, 3] \end{vmatrix}$$

$$- [1, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] \end{vmatrix}$$

$$+ [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 1] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 0] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 1] \\ [0, 3] & [1, 2] & [0, 2] & [0, 3] \end{vmatrix} \Bigg)$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1,2] \begin{vmatrix} [1,3] & [0,2] & [-1,1] & [1,2] \\ [1,2] & [1,3] & [-1,0] & [0,1] \\ [1,3] & [1,2] & [-1,1] & [-1,0] \\ [1,2] & [0,2] & [0,3] & [1,3] \end{vmatrix} \right. \\
 & \quad - [0,1] \begin{vmatrix} [-1,1] & [0,2] & [-1,1] & [1,2] \\ [2,3] & [1,3] & [-1,0] & [0,1] \\ [0,1] & [1,2] & [-1,1] & [-1,0] \\ [0,3] & [0,2] & [0,3] & [1,3] \end{vmatrix} \\
 & \quad + [-1,0] \begin{vmatrix} [-1,1] & [1,3] & [-1,1] & [1,2] \\ [2,3] & [1,2] & [-1,0] & [0,1] \\ [0,1] & [1,3] & [-1,1] & [-1,0] \\ [0,3] & [1,2] & [0,3] & [1,3] \end{vmatrix} \\
 & \quad - [1,3] \begin{vmatrix} [-1,1] & [1,3] & [0,2] & [1,2] \\ [2,3] & [1,2] & [1,3] & [0,1] \\ [0,1] & [1,3] & [1,2] & [-1,0] \\ [0,3] & [1,2] & [0,2] & [1,3] \end{vmatrix} \\
 & \quad \left. + [0,3] \begin{vmatrix} [-1,1] & [1,3] & [0,2] & [-1,1] \\ [2,3] & [1,2] & [1,3] & [-1,0] \\ [0,1] & [1,3] & [1,2] & [-1,1] \\ [0,3] & [1,2] & [0,2] & [0,3] \end{vmatrix} \right) \\
 & + \left( [1,2] \begin{vmatrix} [1,3] & [0,2] & [-1,1] & [-1,0] \\ [1,2] & [1,3] & [-1,0] & [-1,1] \\ [1,3] & [1,2] & [-1,1] & [2,3] \\ [1,2] & [0,2] & [0,3] & [0,1] \end{vmatrix} \right. \\
 & \quad - [0,1] \begin{vmatrix} [-1,1] & [0,2] & [-1,1] & [-1,0] \\ [2,3] & [1,3] & [-1,0] & [-1,1] \\ [0,1] & [1,2] & [-1,1] & [2,3] \\ [0,3] & [0,2] & [0,3] & [0,1] \end{vmatrix} \\
 & \quad + [-1,0] \begin{vmatrix} [-1,1] & [1,3] & [-1,1] & [-1,0] \\ [2,3] & [1,2] & [-1,0] & [-1,1] \\ [0,1] & [1,3] & [-1,1] & [2,3] \\ [0,3] & [1,2] & [0,3] & [0,1] \end{vmatrix} \\
 & \quad - [1,3] \begin{vmatrix} [-1,1] & [1,3] & [0,2] & [-1,0] \\ [2,3] & [1,2] & [1,3] & [-1,1] \\ [0,1] & [1,3] & [1,2] & [2,3] \\ [0,3] & [1,2] & [0,2] & [0,1] \end{vmatrix} \\
 & \quad \left. + [0,2] \begin{vmatrix} [-1,1] & [1,3] & [0,2] & [-1,1] \\ [2,3] & [1,2] & [1,3] & [-1,0] \\ [0,1] & [1,3] & [1,2] & [-1,1] \\ [0,3] & [1,2] & [0,2] & [0,3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \left( [1, 2] \begin{vmatrix} [1, 3] & [0, 2] & [0, 3] & [1, 2] \\ [1, 2] & [1, 3] & [0, 2] & [0, 1] \\ [1, 3] & [1, 2] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix} \right. \\
 & - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [0, 3] & [1, 2] \\ [2, 3] & [1, 3] & [0, 2] & [0, 1] \\ [0, 1] & [1, 2] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 2] & [2, 3] & [1, 3] \end{vmatrix} \\
 & + [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 3] & [1, 2] \\ [2, 3] & [1, 2] & [0, 2] & [0, 1] \\ [0, 1] & [1, 3] & [0, 1] & [-1, 0] \\ [0, 3] & [1, 2] & [2, 3] & [1, 3] \end{vmatrix} \\
 & - [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] \end{vmatrix} \\
 & \left. + [0, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] \end{vmatrix} \right) \\
 & - \left( [1, 2] \begin{vmatrix} [1, 3] & [0, 2] & [0, 3] & [-1, 0] \\ [1, 2] & [1, 3] & [0, 2] & [-1, 1] \\ [1, 3] & [1, 2] & [0, 1] & [2, 3] \\ [1, 2] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \right. \\
 & - [0, 1] \begin{vmatrix} [-1, 1] & [0, 2] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 2] & [0, 1] & [2, 3] \\ [0, 3] & [0, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & + [-1, 0] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 3] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 2] & [-1, 1] \\ [0, 1] & [1, 3] & [0, 1] & [2, 3] \\ [0, 3] & [1, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & - [2, 3] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 1] \end{vmatrix} \\
 & \left. + [0, 2] \begin{vmatrix} [-1, 1] & [1, 3] & [0, 2] & [0, 3] \\ [2, 3] & [1, 2] & [1, 3] & [0, 2] \\ [0, 1] & [1, 3] & [1, 2] & [0, 1] \\ [0, 3] & [1, 2] & [0, 2] & [2, 3] \end{vmatrix} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{array}{c} \left[ \begin{array}{cccc} [1, 3] & [0, 2] & [1, 2] & [-1, 0] \\ [1, 2] & [1, 3] & [0, 1] & [-1, 1] \\ [1, 3] & [1, 2] & [-1, 0] & [2, 3] \\ [1, 2] & [0, 2] & [1, 3] & [0, 1] \end{array} \right] \\ - [0, 1] \left[ \begin{array}{cccc} [-1, 1] & [0, 2] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 3] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 2] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 2] & [1, 3] & [0, 1] \end{array} \right] \\ + [-1, 0] \left[ \begin{array}{cccc} [-1, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [1, 3] & [-1, 0] & [2, 3] \\ [0, 3] & [1, 2] & [1, 3] & [0, 1] \end{array} \right] \\ - [0, 3] \left[ \begin{array}{cccc} [-1, 1] & [1, 3] & [0, 2] & [-1, 0] \\ [2, 3] & [1, 2] & [1, 3] & [-1, 1] \\ [0, 1] & [1, 3] & [1, 2] & [2, 3] \\ [0, 3] & [1, 2] & [0, 2] & [0, 1] \end{array} \right] \\ + [0, 2] \left[ \begin{array}{cccc} [-1, 1] & [1, 3] & [0, 2] & [1, 2] \\ [2, 3] & [1, 2] & [1, 3] & [0, 1] \\ [0, 1] & [1, 3] & [1, 2] & [-1, 0] \\ [0, 3] & [1, 2] & [0, 2] & [1, 3] \end{array} \right] \right) \\
 & - \left( [1, 2] \begin{array}{c} \left[ \begin{array}{cccc} [-1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [-2, 1] & [-1, 0] & [0, 2] & [0, 1] \\ [-1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [-1, 2] & [0, 3] & [2, 3] & [1, 3] \end{array} \right] \\ - [0, 2] \left[ \begin{array}{cccc} [-1, 1] & [-1, 1] & [0, 3] & [1, 2] \\ [2, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 3] & [0, 3] & [2, 3] & [1, 3] \end{array} \right] \\ + [1, 3] \left[ \begin{array}{cccc} [-1, 1] & [-1, 3] & [0, 3] & [1, 2] \\ [2, 3] & [-2, 1] & [0, 2] & [0, 1] \\ [0, 1] & [-1, 2] & [0, 1] & [-1, 0] \\ [0, 3] & [-1, 2] & [2, 3] & [1, 3] \end{array} \right] \\ - [2, 3] \left[ \begin{array}{cccc} [-1, 1] & [-1, 3] & [-1, 1] & [1, 2] \\ [2, 3] & [-2, 1] & [-1, 0] & [0, 1] \\ [0, 1] & [-1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [-1, 2] & [0, 3] & [1, 3] \end{array} \right] \\ + [0, 3] \left[ \begin{array}{cccc} [-1, 1] & [-1, 3] & [-1, 1] & [0, 3] \\ [2, 3] & [-2, 1] & [-1, 0] & [0, 2] \\ [0, 1] & [-1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [-1, 2] & [0, 3] & [2, 3] \end{array} \right] \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & + \begin{pmatrix} [1, 2] \\ [1, 2] \end{pmatrix} \begin{vmatrix} [-1, 3] & [-1, 1] & [0, 3] & [-1, 0] \\ [-2, 1] & [-1, 0] & [0, 2] & [-1, 1] \\ [-1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [-1, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\
 & - [0, 2] \begin{vmatrix} [-1, 1] & [-1, 1] & [0, 3] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [0, 1] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 3] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\
 & + [1, 3] \begin{vmatrix} [-1, 1] & [-1, 3] & [0, 3] & [-1, 0] \\ [2, 3] & [-2, 1] & [0, 2] & [-1, 1] \\ [0, 1] & [-1, 2] & [0, 1] & [2, 3] \\ [0, 3] & [-1, 2] & [2, 3] & [0, 1] \end{vmatrix} \\
 & - [2, 3] \begin{vmatrix} [-1, 1] & [-1, 3] & [-1, 1] & [-1, 0] \\ [2, 3] & [-2, 1] & [-1, 0] & [-1, 1] \\ [0, 1] & [-1, 2] & [-1, 1] & [2, 3] \\ [0, 3] & [-1, 2] & [0, 3] & [0, 1] \end{vmatrix} \\
 & + [0, 2] \begin{vmatrix} [-1, 1] & [-1, 3] & [-1, 1] & [0, 3] \\ [2, 3] & [-2, 1] & [-1, 0] & [0, 2] \\ [0, 1] & [-1, 2] & [-1, 1] & [0, 1] \\ [0, 3] & [-1, 2] & [0, 3] & [2, 3] \end{vmatrix} \\
 & - \begin{pmatrix} [1, 2] \\ [1, 2] \end{pmatrix} \begin{vmatrix} [-1, 3] & [-1, 1] & [1, 2] & [-1, 0] \\ [-2, 1] & [-1, 0] & [0, 1] & [-1, 1] \\ [-1, 2] & [-1, 1] & [-1, 0] & [2, 3] \\ [-1, 2] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix} \\
 & - [0, 2] \begin{vmatrix} [-1, 1] & [-1, 1] & [1, 2] & [-1, 0] \\ [2, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix} \\
 & + [1, 3] \begin{vmatrix} [-1, 1] & [-1, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [-2, 1] & [0, 1] & [-1, 1] \\ [0, 1] & [-1, 2] & [-1, 0] & [2, 3] \\ [0, 3] & [-1, 2] & [1, 3] & [0, 1] \end{vmatrix} \\
 & - [0, 3] \begin{vmatrix} [-1, 1] & [-1, 3] & [-1, 1] & [-1, 0] \\ [2, 3] & [-2, 1] & [-1, 0] & [-1, 1] \\ [0, 1] & [-1, 2] & [-1, 1] & [2, 3] \\ [0, 3] & [-1, 2] & [0, 3] & [0, 1] \end{vmatrix} \\
 & + [0, 2] \begin{vmatrix} [-1, 1] & [-1, 3] & [-1, 1] & [1, 2] \\ [2, 3] & [-2, 1] & [-1, 0] & [0, 1] \\ [0, 1] & [-1, 2] & [-1, 1] & [-1, 0] \\ [0, 3] & [-1, 2] & [0, 3] & [1, 3] \end{vmatrix}
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [1, 2] \begin{array}{cccc} [-2, 4] & [0, 3] & [1, 2] & [-1, 0] \\ [-3, 1] & [0, 2] & [0, 1] & [-1, 1] \\ [-2, 3] & [0, 1] & [-1, 0] & [2, 3] \\ [-1, 5] & [2, 3] & [1, 3] & [0, 1] \end{array} \right. \\
 & \quad - [1, 5] \begin{array}{cccc} [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [2, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [0, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{array} \\
 & \quad + [2, 3] \begin{array}{cccc} [-1, 1] & [-2, 4] & [1, 2] & [-1, 0] \\ [2, 3] & [-3, 1] & [0, 1] & [-1, 1] \\ [0, 1] & [-2, 3] & [-1, 0] & [2, 3] \\ [0, 3] & [-1, 5] & [1, 3] & [0, 1] \end{array} \\
 & \quad - [0, 3] \begin{array}{cccc} [-1, 1] & [-2, 4] & [0, 3] & [-1, 0] \\ [2, 3] & [-3, 1] & [0, 2] & [-1, 1] \\ [0, 1] & [-2, 3] & [0, 1] & [2, 3] \\ [0, 3] & [-1, 5] & [2, 3] & [0, 1] \end{array} \\
 & \quad \left. + [0, 2] \begin{array}{cccc} [-1, 1] & [-2, 4] & [0, 3] & [1, 2] \\ [2, 3] & [-3, 1] & [0, 2] & [0, 1] \\ [0, 1] & [-2, 3] & [0, 1] & [-1, 0] \\ [0, 3] & [-1, 5] & [2, 3] & [1, 3] \end{array} \right) \\
 & + \left( [0, 1] \begin{array}{cccc} [-2, 0] & [-1, 1] & [0, 3] & [1, 2] \\ [-3, -1] & [-1, 0] & [0, 2] & [0, 1] \\ [-2, -1] & [-1, 1] & [0, 1] & [-1, 0] \\ [-2, 0] & [0, 3] & [2, 3] & [1, 3] \end{array} \right. \\
 & \quad - [0, 1] \begin{array}{cccc} [1, 3] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 2] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 3] & [-1, 1] & [0, 1] & [-1, 0] \\ [1, 2] & [0, 3] & [2, 3] & [1, 3] \end{array} \\
 & \quad + [1, 3] \begin{array}{cccc} [1, 3] & [-2, 0] & [0, 3] & [1, 2] \\ [1, 2] & [-3, -1] & [0, 2] & [0, 1] \\ [1, 3] & [-2, -1] & [0, 1] & [-1, 0] \\ [1, 2] & [-2, 0] & [2, 3] & [1, 3] \end{array} \\
 & \quad - [2, 3] \begin{array}{cccc} [1, 3] & [-2, 0] & [-1, 1] & [1, 2] \\ [1, 2] & [-3, -1] & [-1, 0] & [0, 1] \\ [1, 3] & [-2, -1] & [-1, 1] & [-1, 0] \\ [1, 2] & [-2, 0] & [0, 3] & [1, 3] \end{array} \\
 & \quad \left. + [0, 3] \begin{array}{cccc} [1, 3] & [-2, 0] & [-1, 1] & [0, 3] \\ [1, 2] & [-3, -1] & [-1, 0] & [0, 2] \\ [1, 3] & [-2, -1] & [-1, 1] & [0, 1] \\ [1, 2] & [-2, 0] & [0, 3] & [2, 3] \end{array} \right)
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.

b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( [0, 1] \begin{vmatrix} [-2, 0] & [-1, 1] & [0, 3] & [-1, 0] \\ [-3, -1] & [-1, 0] & [0, 2] & [-1, 1] \\ [-2, -1] & [-1, 1] & [0, 1] & [2, 3] \\ [-2, 0] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [0, 1] \begin{vmatrix} [1, 3] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 2] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 3] & [-1, 1] & [0, 1] & [2, 3] \\ [1, 2] & [0, 3] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [1, 3] & [-2, 0] & [0, 3] & [-1, 0] \\ [1, 2] & [-3, -1] & [0, 2] & [-1, 1] \\ [1, 3] & [-2, -1] & [0, 1] & [2, 3] \\ [1, 2] & [-2, 0] & [2, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [2, 3] \begin{vmatrix} [1, 3] & [-2, 0] & [-1, 1] & [-1, 0] \\ [1, 2] & [-3, -1] & [-1, 0] & [-1, 1] \\ [1, 3] & [-2, -1] & [-1, 1] & [2, 3] \\ [1, 2] & [-2, 0] & [0, 3] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [1, 3] & [-2, 0] & [-1, 1] & [0, 3] \\ [1, 2] & [-3, -1] & [-1, 0] & [0, 2] \\ [1, 3] & [-2, -1] & [-1, 1] & [0, 1] \\ [1, 2] & [-2, 0] & [0, 3] & [2, 3] \end{vmatrix} \right) \\
 & + \left( [0, 1] \begin{vmatrix} [-2, 0] & [-1, 1] & [1, 2] & [-1, 0] \\ [-3, -1] & [-1, 0] & [0, 1] & [-1, 1] \\ [-2, -1] & [-1, 1] & [-1, 0] & [2, 3] \\ [-2, 0] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix} \right. \\
 & \quad - [0, 1] \begin{vmatrix} [1, 3] & [-1, 1] & [1, 2] & [-1, 0] \\ [1, 2] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 3] & [-1, 1] & [-1, 0] & [2, 3] \\ [1, 2] & [0, 3] & [1, 3] & [0, 1] \end{vmatrix} \\
 & \quad + [1, 3] \begin{vmatrix} [1, 3] & [-2, 0] & [1, 2] & [-1, 0] \\ [1, 2] & [-3, -1] & [0, 1] & [-1, 1] \\ [1, 3] & [-2, -1] & [-1, 0] & [2, 3] \\ [1, 2] & [-2, 0] & [1, 3] & [0, 1] \end{vmatrix} \\
 & \quad - [0, 3] \begin{vmatrix} [1, 3] & [-2, 0] & [-1, 1] & [-1, 0] \\ [1, 2] & [-3, -1] & [-1, 0] & [-1, 1] \\ [1, 3] & [-2, -1] & [-1, 1] & [2, 3] \\ [1, 2] & [-2, 0] & [0, 3] & [0, 1] \end{vmatrix} \\
 & \quad \left. + [0, 2] \begin{vmatrix} [1, 3] & [-2, 0] & [-1, 1] & [1, 2] \\ [1, 2] & [-3, -1] & [-1, 0] & [0, 1] \\ [1, 3] & [-2, -1] & [-1, 1] & [-1, 0] \\ [1, 2] & [-2, 0] & [0, 3] & [1, 3] \end{vmatrix} \right)
 \end{aligned}$$



Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & \left( \begin{array}{c} [0, 1] \\ \vdots \\ \vdots \end{array} \right) \begin{array}{c} \left| \begin{array}{cccc} [-3, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [-4, -1] & [0, 2] & [0, 1] & [-1, 1] \\ [-3, 0] & [0, 1] & [-1, 0] & [2, 3] \\ [-2, 3] & [2, 3] & [1, 3] & [0, 1] \end{array} \right| \\ - [1, 4] \left| \begin{array}{cccc} [1, 3] & [0, 3] & [1, 2] & [-1, 0] \\ [1, 2] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 3] & [0, 1] & [-1, 0] & [2, 3] \\ [1, 2] & [2, 3] & [1, 3] & [0, 1] \end{array} \right| \\ + [2, 3] \left| \begin{array}{cccc} [1, 3] & [-3, 1] & [1, 2] & [-1, 0] \\ [1, 2] & [-4, -1] & [0, 1] & [-1, 1] \\ [1, 3] & [-3, 0] & [-1, 0] & [2, 3] \\ [1, 2] & [-2, 3] & [1, 3] & [0, 1] \end{array} \right| \\ - [0, 3] \left| \begin{array}{cccc} [1, 3] & [-3, 1] & [0, 3] & [-1, 0] \\ [1, 2] & [-4, -1] & [0, 2] & [-1, 1] \\ [1, 3] & [-3, 0] & [0, 1] & [2, 3] \\ [1, 2] & [-2, 3] & [2, 3] & [0, 1] \end{array} \right| \\ + [0, 2] \left| \begin{array}{cccc} [1, 3] & [-3, 1] & [0, 3] & [1, 2] \\ [1, 2] & [-4, -1] & [0, 2] & [0, 1] \\ [1, 3] & [-3, 0] & [0, 1] & [-1, 0] \\ [1, 2] & [-2, 3] & [2, 3] & [1, 3] \end{array} \right| \end{array} \right) \\
 & + \left( \begin{array}{c} [-1, 0] \\ \vdots \\ \vdots \end{array} \right) \begin{array}{c} \left| \begin{array}{cccc} [-1, 1] & [0, 3] & [1, 2] & [-1, 0] \\ [-1, 0] & [0, 2] & [0, 1] & [-1, 1] \\ [-1, 1] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 3] & [2, 3] & [1, 3] & [0, 1] \end{array} \right| \\ - [1, 3] \left| \begin{array}{cccc} [0, 2] & [0, 3] & [1, 2] & [-1, 0] \\ [1, 3] & [0, 2] & [0, 1] & [-1, 1] \\ [1, 2] & [0, 1] & [-1, 0] & [2, 3] \\ [0, 2] & [2, 3] & [1, 3] & [0, 1] \end{array} \right| \\ + [2, 3] \left| \begin{array}{cccc} [0, 2] & [-1, 1] & [1, 2] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 1] & [-1, 1] \\ [1, 2] & [-1, 1] & [-1, 0] & [2, 3] \\ [0, 2] & [0, 3] & [1, 3] & [0, 1] \end{array} \right| \\ - [0, 3] \left| \begin{array}{cccc} [0, 2] & [-1, 1] & [0, 3] & [-1, 0] \\ [1, 3] & [-1, 0] & [0, 2] & [-1, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [2, 3] \\ [0, 2] & [0, 3] & [2, 3] & [0, 1] \end{array} \right| \\ + [0, 2] \left| \begin{array}{cccc} [0, 2] & [-1, 1] & [0, 3] & [1, 2] \\ [1, 3] & [-1, 0] & [0, 2] & [0, 1] \\ [1, 2] & [-1, 1] & [0, 1] & [-1, 0] \\ [0, 2] & [0, 3] & [2, 3] & [1, 3] \end{array} \right| \end{array} \right)
 \end{aligned}$$

dengan menggunakan ekspansi kofaktor diperoleh hasil :

**Hak Cipta Dilindungi Undang-Undang**

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:

- Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
- Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilarang mengemukakan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 &= [1, 2][-253, 286] - [0, 1][-221, 188] + [-1, 0][-287, 203] \\
 &\quad - [1, 3][-275, 301] + [2, 3][-256, 245] \\
 &= ([1, 2][-189, 213] - [0, 1][-195, 133] + [-1, 0][-255, 145] \\
 &\quad - [1, 3][-230, 240] + [0, 3][-230, 247]) \\
 &+ ([1, 2][-239, 220] - [0, 1][-129, 212] + [-1, 0][-117, 250] \\
 &\quad - [1, 3][-236, 207] + [0, 2][-230, 247]) \\
 &- ([1, 2][-250, 252] - [0, 1][-194, 174] + [-1, 0][-216, 220] \\
 &\quad - [2, 3][-230, 240] + [0, 3][-263, 304]) \\
 &+ ([1, 2][-242, 192] - [0, 1][-169, 249] + [-1, 0][-176, 243] \\
 &\quad - [2, 3][-236, 207] + [0, 2][-293, 274]) \\
 &+ ([1, 2][-208, 217] - [0, 1][-158, 218] + [-1, 0][-172, 238] \\
 &\quad - [2, 3][-236, 207] + [0, 2][-233, 243]) \\
 &- ([1, 2][-256, 150] - [0, 2][-138, 150] + [1, 3][-257, 277] \\
 &\quad - [2, 3][-213, 161] + [0, 3][-273, 213]) \\
 &+ ([1, 2][-235, 202] - [0, 2][-224, 123] + [1, 3][-247, 261] \\
 &\quad - [2, 3][-134, 256] + [0, 2][-279, 216]) \\
 &- ([1, 2][-135, 172] - [0, 2][-168, 98] + [1, 3][-172, 238] \\
 &\quad - [0, 3][-117, 250] + [0, 2][-228, 138]) \\
 &+ ([1, 2][-294, 366] - [1, 5][-168, 188] + [2, 3][-343, 321] \\
 &\quad - [0, 3][-461, 385] + [0, 2][-362, 387]) \\
 &+ ([0, 1][-154, 156] - [0, 1][-158, 164] + [1, 3][-246, 230] \\
 &\quad - [2, 3][-225, 189] + [0, 3][-240, 207]) \\
 &- ([0, 1][-123, 261] - [0, 1][-247, 115] + [1, 3][-184, 300] \\
 &\quad - [2, 3][-167, 234] + [0, 2][-258, 207]) \\
 &+ ([0, 1][-158, 164] - [0, 1][-218, 140] + [1, 3][-262, 210] \\
 &\quad - [0, 3][-163, 236] + [0, 2][-234, 225]) \\
 &- ([0, 1][-318, 301] - [1, 4][-203, 198] + [2, 3][-213, 412] \\
 &\quad - [0, 3][-306, 466] + [0, 2][-369, 391]) \\
 &+ ([-1, 0][-239, 92] - [1, 3][-202, 204] + [2, 3][-153, 158] \\
 &\quad - [0, 3][-261, 133] + [0, 2][-183, 185]) \\
 &= ([-506, 572] - [-221, 188] + [-203, 287] - [-825, 903] + [-768, 735]) \\
 &- ([-378, 426] - [-195, 133] + [-145, 255] - [-690, 720] + [-690, 741]) \\
 &+ ([-478, 440] - [-129, 212] + [-250, 117] - [-708, 621] + [-460, 494])
 \end{aligned}$$

Hak Cipta Dilindungi Undang-Undang

1. Dilarang mengutip sebagian atau seluruh karya tulis ini tanpa mencantumkan dan menyebutkan sumber:
  - a. Pengutipan hanya untuk kepentingan pendidikan, penelitian, penulisan karya ilmiah, penyusunan laporan, penulisan kritik atau tinjauan suatu masalah.
  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilarang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$$\begin{aligned}
 & -([-500, 504] - [-194, 174] + [-220, 216] - [-690, 720] + [-789, 912]) \\
 & +([-484, 384] - [-169, 249] + [-243, 176] - [-708, 621] + [-586, 548]) \\
 & +([-416, 434] - [-158, 218] + [-238, 172] - [-708, 621] + [-466, 486]) \\
 & -([-512, 300] - [-276, 300] + [-771, 831] - [-639, 483] + [-819, 639]) \\
 & +([-470, 404] - [-448, 246] + [-741, 783] - [-402, 768] + [-558, 432]) \\
 & -([-270, 344] - [-168, 98] + [-516, 714] - [-351, 750] + [-456, 276]) \\
 & +([-588, 732] - [-840, 940] + [-1029, 963] - [-1383, 1155] + [-724, 774]) \\
 & +([-154, 156] - [-158, 164] + [-738, 690] - [-675, 567] + [-720, 621]) \\
 & -([-123, 261] - [-247, 115] + [-552, 900] - [-501, 702] + [-516, 414]) \\
 & +([-328, 316] - [-218, 140] + [-786, 630] - [-489, 708] + [-702, 675]) \\
 & -([-318, 301] - [-812, 792] + [-639, 1236] - [-918, 1398] + [-738, 1173]) \\
 & +([-92, 239] - [-606, 612] + [-459, 474] - [-783, 399] + [-366, 370]) \\
 & = ([-2568, 2640]) - ([-2066, 2307]) + ([-2021, 1888]) + ([-2403, 2516]) \\
 & - ([-2183, 1985]) + ([-1959, 1958]) - ([-2885, 2685]) + ([-2783, 2469]) \\
 & - ([-2090, 1853]) + ([-4436, 4692]) + ([-2343, 2300]) - ([-2008, 2323]) \\
 & + ([-2664, 2328]) - ([-3885, 4440]) + ([-1928, 2472]) \\
 & = [-38698, 38381]
 \end{aligned}$$

Untuk  $p = 3$  dengan cara yang sama seperti di atas di peroleh hasil determinan matriks interval berukuran  $5 \times 7$  sebagai berikut :

$$|A_{5 \times 7}| = [-36422, 35804].$$

Sedangkan untuk  $p = 4$  dengan cara yang sama seperti di atas di peroleh hasil determinan matriks interval berukuran  $5 \times 7$  sebagai berikut :

$$|A_{5 \times 7}| = [-34652, 34084].$$

Pada Contoh 4.2 dan 4.8 diperoleh hasil yang berbeda dengan matriks yang sama, sehingga disimpulkan bahwa Teorema 2.4 tidak berlaku untuk matriks interval.