小テスト(5/1)

We have 4 matrices A_1, A_2, A_3, A_4 to multiply and each matrix A_n has m_n rows and m_{n+1} columns. Let $m_1 = 6, m_2 = 5, m_3 = 4, m_4 = 8$ and $m_5 = 5$. Then solve the chained matrix products problem by recursive equation. (Give the minimum of the number of scalar product and the optimal product order for $A_1A_2A_3A_4$.)

$$v(\{i,\ i+1\}) = 0, \quad i = 1, 2, 3, 4$$

$$\begin{aligned} v(\{1,2,3\}) &= r(\{1,2,3\},2) + (v(\{1,2\}) + v(\{2,3\})) \\ &= 6 \cdot 5 \cdot 4 + (0+0) = 120, \qquad \pi^*(\{1,2,3\}) = 2 \end{aligned}$$

$$v(\{2,3,4\}) = 160, \qquad \pi^*(\{2,3,4\}) = 3$$

$$v(\{3,4,5\}) = 160, \qquad \pi^*(\{3,4,5\}) = 4$$

$$\begin{aligned} v(\{1,2,3,4\}) &= \min\{r(\{1,2,3,4\},2) + (v(\{1,2\}) + v(\{2,3,4\})), \\ &\qquad r(\{1,2,3,4\},3) + (v(\{1,2,3\}) + v(\{3,4\}))\} \\ &= \min\{6 \cdot 5 \cdot 8 + (0+160), 6 \cdot 4 \cdot 8 + (120+0)\} \\ &= 312, \qquad \pi^*(\{1,2,3,4\}) = 3 \end{aligned}$$

$$v(\{2,3,4,5\}) = 260, \qquad \pi^*(\{2,3,4,5\}) = 3$$

$$v(\{1,2,3,4,5\}) = 400, \qquad \pi^*(\{1,2,3,4,5\}) = 3$$

$$(A_1A_2)(A_3A_4) \quad \left(\pi^*(\{1,2,3,4,5\}) = 3 \qquad \begin{matrix} \pi^*(\{1,2,3\}) = 2 \\ \pi^*(\{3,4,5\}) = 4 \end{matrix} \right)$$

欠席者用課題

We have 4 matrices A_1, A_2, A_3, A_4 to multiply and each matrix A_n has m_n rows and m_{n+1} columns. Let $m_1 = 5, m_2 = 12, m_3 = 3, m_4 = 10$ and $m_5 = 4$. Then solve the chained matrix products problem by recursive equation. (Give the minimum of the number of scalar product and the optimal product order for $A_1A_2A_3A_4$.)

$$v(\{i,\ i+1\}) = 0, \quad i = 1, 2, 3, 4$$

$$v(\{1,2,3\}) =$$

$$\vdots$$