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ارفان سرور ۹۵۲۱۸۰۷

وارون ماتریس A که از روش اول مثلث ضیام تشکیل شده است؟

$$\underbrace{\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 \\ 1 & 2 & 1 & 0 & 0 \\ 1 & 3 & 3 & 1 & 0 \\ 1 & 4 & 6 & 4 & 1 \end{bmatrix}}_{A} \underbrace{\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ b_{21} & 1 & 0 & 0 & 0 \\ b_{31} & b_{32} & 1 & 0 & 0 \\ b_{41} & b_{42} & b_{43} & 1 & 0 \\ b_{51} & b_{52} & b_{53} & b_{54} & 0 \end{bmatrix}}_{A^{-1}} = I$$

$b_{21} + 1 = 0 \Rightarrow b_{21} = -1$ $\quad 1 + 2b_{21} + b_{31} = 0 \Rightarrow b_{31} = 1$

$2 + b_{32} = 0 \Rightarrow b_{32} = -2$ $\quad 1 + 3b_{21} + 3b_{31} + b_{41} = 0 \Rightarrow b_{41} = -1$

$3 + 3b_{32} + b_{42} = 0 \Rightarrow b_{42} = 3$ $\quad 3 + b_{43} = 0 \Rightarrow b_{43} = -3$

$1 + 4b_{21} + 6b_{31} + 4b_{41} + b_{51} = 0 \Rightarrow 1 - 4 + 6 - 4 + b_{51} = 0 \Rightarrow b_{51} = 1$

$4 + 6b_{32} + 4b_{42} + b_{52} = 0 \Rightarrow 4 - 12 + 12 + b_{52} = 0 \Rightarrow b_{52} = -4$

$4 + 4b_{43} + b_{53} = 0 \Rightarrow b_{53} = 4$ $\quad 4 + b_{54} = 0 \Rightarrow b_{54} = -4$

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$$\Rightarrow A^{-1} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -1 & 1 & 0 & 0 & 0 \\ 1 & -2 & 1 & 0 & 0 \\ -1 & 3 & -3 & 1 & 0 \\ 1 & -4 & 4 & -4 & 1 \end{bmatrix} = \left((-1)^{i+j} \binom{i}{j} \right)$$

$0 \le i, j \le 4$