Análisis de Algoritmos

Matriz de Vandermonde

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①

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & i & -1 & -i \\ 1 & -1 & 1 & -1 \\ 1 & -i & -1 & i \end{bmatrix} \cdot \begin{bmatrix} 2 \\ -1 \\ 0 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 2 - 1 - 0 + 1 \\ 2 - i + 0 - i \\ 2 + 1 + 0 - 1 \\ 2 + i + 0 + i \end{bmatrix} = \begin{matrix} 2 \\ 2-2i \\ 2 \\ 2+2i \end{matrix}$$

②

$$\begin{aligned} w_4^0 &= 1 \\ w_4^1 &= -i \\ w_4^2 &= -1 \\ w_4^3 &= i \end{aligned} \quad = \quad \frac{1}{4}\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -i & (-i)^2 & (-i)^3 \\ 1 & -1 & (-1)^2 & (-1)^3 \\ 1 & i & i^2 & i^3 \end{bmatrix} = \frac{1}{4}\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -i & -1 & i \\ 1 & -1 & 1 & -1 \\ 1 & i & -1 & -i \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & i & -1 & -i \\ 1 & -1 & 1 & -1 \\ 1 & -i & -1 & i \end{bmatrix} \cdot \frac{1}{4}\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -i & -1 & i \\ 1 & -1 & 1 & -1 \\ 1 & i & -1 & -i \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

③

$$\frac{1}{4}\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -i & -1 & i \\ 1 & -1 & 1 & -1 \\ 1 & i & -1 & -i \end{bmatrix} \cdot \begin{bmatrix} 2 \\ 2-2i \\ 2 \\ 2+2i \end{bmatrix} =$$

$$\begin{bmatrix} 2/4 + (2/4 - 2/4 i) + 2/4 + (2/4 + 2/4 i) \\ 2/4 - i(2/4 - 2/4 i) - 2/4 + i(2/4 + 2/4 i) \\ 2/4 - (2/4 - 2/4 i) + 2/4 - (2/4 + 2/4 i) \\ 2/4 + i(2/4 - 2/4 i) - 2/4 - i(2/4 + 2/4 i) \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ 0 \\ 1 \end{bmatrix}$$