$$F_N^{-1} = \frac{1}{N} \overline{F}_N \implies \overline{F}_N = \frac{1}{N}[\overline{w}^{-nk}] \quad , \quad F_N \overline{F}_N = \overline{F}_N F_N = NI$$

$$\underbrace{\overline{F}_N = [\overline{w}^{-nk}]} \leftarrow \text{ خط غلط! کم تعریف می کنیم}$$

ضرب سطر آام در ستون آام $\quad [w^{ik}][w^{-kj}] = [w^{k(i-j)}]$

$i = j \implies [w^0] = N$

$w^{N(i-j)} = e^{-2\pi i \frac{N}{N}(i-j)} = e^{-2\pi i (i-j)} = 1$

$$i \neq j \implies \sum_{k=0}^{N-1}[w^{k(i-j)}] = \frac{w^{N(i-j)} - 1}{w^{(i-j)} - 1} = 0$$

$$\implies \overline{F}_N F_N = NI = F_N \overline{F}_N$$

آن طاها می شود