JAIAM

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Sheet 1

Ex 2: $A = (a_{\alpha,\beta})_{\alpha,\beta \in \{1,\dots,n\}}$

a) (1) $\Rightarrow$ $a_{\alpha,\beta} = e^{-2\pi i \alpha \frac{\beta}{n}}$

b) $\frac{1}{n} A^* \overset{a)}{=} \frac{1}{n} \left(e^{+2\pi i \alpha \frac{\beta}{n}}\right)_{\alpha,\beta \in \{1,\dots,n\}}$ $\overset{(2)}{\Leftrightarrow}$ $\frac{1}{n} A^* = A^{-1}$ =: (#)

c) (#) $\Rightarrow$ $\frac{1}{\sqrt{n}} A^* = \sqrt{n} A^{-1} = \left(\frac{A}{\sqrt{n}}\right)^{-1}$

$\Rightarrow$ let $\tilde{A} := \frac{1}{\sqrt{n}} A$ $\rightsquigarrow$ fulfills $\tilde{A}^* = \tilde{A}^{-1}$