1 | Axler7.8 conjugate transpose

def

The *conjugate transpose* of an m-by-n matrix is the n-by-m matrix obtained by taking the transpose then the complex conjugate of each entry.

If $\mathbb{F} = \mathbb{R}$ then the conjugate transpose is just the transpose.

2 | Axler7.10 The matrix of T^* (adjoint)

Let $T \in \mathcal{L}(V, W)$. Suppose e_1, \dots, e_n is an orthonormal basis of V and f_1, \dots, f_m is an orthonormal basis of W. Then,

$$\mathcal{M}(T^*,(f_1,\ldots,f_m),(e_1,\ldots,e_n))$$

is the conjugate transpose of

$$\mathcal{M}(T,(e_1,\ldots,e_n),(f_1,\ldots,f_m))$$

However, since **this only works with orthonormal bases**, Axler decided to focus on adjoints instead of conjugate transposes. (but they are the same thing under orthonormal bases).

Taproot • 2021-2022 Page 1