Exercises to the linear algebra II, series 2

Daniel Mayer
Matrikel:
2519400

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prove the validity of the following statements:

$(A^+)^+ = A$

transposition and conjugation are commutative, ie.
$\mathbf{A}_{ij}^+ = \left(\mathbf{A}_{ij}^*\right)^T = \mathbf{A}_{ji}^* = \left(\mathbf{A}_{ij}^T\right)^*$ therefore

$$\left(\mathbf{A}_{ij}^+\right)^+ = \left(\mathbf{A}_{ji}^*\right)^+ = \left(\mathbf{A}_{ij}^*\right)^* = \mathbf{A}_{ij}^{**} = \mathbf{A}_{ij}$$

$(A^*)^+ = (A^+)^*$

$$\left(A^*\right)^+ = \left(A^*\right)^* \left(A^+\right)^*$$