## Homework

## Exercise 1:

Let $A, B \in M_{n}$.
3. If $A, B$ are Hermitian then $a A+b B$ is Hermitian
4. $A-A^{*}$ is skew-Hermitian for all $A \in M_{n}$.

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Exercise 2. The real symmetric matrix $\quad M=\left[\begin{array}{ccc}2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2\end{array}\right]$
is positive definite? is positive semi-definite? is negative definite? is negative semi-definite?

Exercise 3. Let $A, B \in M_{n}(\mathbb{C})$. Then
3. $B^{*} B$ is positive semidefinite.
4. If $B$ is invertible then $B^{*} B$ is positive definite.

