## Notations and symbols

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| $\mathbb{F}$ | a field, usually the field of real ($\mathbb{R}$) or complex ($\mathbb{C}$) numbers. |
| $\mathbb{F}^k$ | k-vectors, over $\mathbb{F}$. |
| $\mathbb{F}^{m\times n}$ | $m \times n$ matrices over $\mathbb{F}$. |
| $\mathrm{Re}(z),\ \mathrm{Im}(z)$ | real and imaginary part of $z \in \mathbb{C}$. |
| $\lambda(A)$ | eigenvalue of the matrix $A$. |
| $\rho(A)$ | spectral radius of the matrix $A$. |
| $\overline{\sigma}(A)$ | largest singular value of the matrix $A$. |
| $\underline{\sigma}(A)$ | smallest singular value of the matrix $A$. |
| $\mathbb{S}^n$ | the symmetric $n \times n$ matrices over $\mathbb{R}$. |
| $\mathbb{H}^n$ | the Hermitian $n \times n$ matrices over $\mathbb{C}$. |
| $I_k$ | the $k \times k$ identity matrix. |
| $M^T$ | transpose of a matrix $M$. |
| $M^*$ | complex-conjugate transpose of a matrix $M$. |
| $in(A)$ | the inertia of a symmetric matrix $A$. |
| $M^\dagger$ | the Moore-Penrose pseudoinverse of a matrix $M$. |
| $\mathbf{Im}\,(M)$ | the image of a matrix $M$. |
| $\mathbf{Ker}\,(M)$ | the kernel of a matrix $M$. |
| $M_\dashv$ | a matrix whose columns form a basis of **Ker** (M). |
| $M_\perp$ | $M_\perp^*$ is an arbitrary basis matrix in $\mathbf{Ker}\,(M^*)$. |
| $\mathcal{U}^\perp$ | the orthogonal complement of a subspace $\mathcal{U}$. |
| $A > 0$ or $A > 0$ | the symmetric matrix $A$ is positive or negative definite. |
| $A \geq 0$ or $A \leq 0$ | the symmetric matrix $A$ is positive or negative semi-definit. |
| $A > 0$ | $A$ and $B$ are symmetric matrices and $A - B > 0$. |
| $A^{\frac{1}{2}}$ | for $A > 0$ the unique $Q = Q^T$ such that $Q > 0$ and $Q^2 = A$. |
| $\mathbf{tr}(A)$ | the trace of a symmetric matrix $A$. |
| $\mathbf{det}(A)$ | the determinant of a symmetric matrix $A$. |
| $\lambda(A)$ | the set of all eigenvalues of a square matrix $A$. |
| $\|M\|$ | the spectral or $\|.\|_2$ norm of a vector or matrix $M$. |
| $\langle x, y\rangle = x^T y$ | the standard scalar product of the vectors $u, v \in \mathbb{F}^n$. |
| $\mathcal{L}(\mathcal{U}, \mathcal{V})$ | the vector space of the $\mathcal{U} \to \mathcal{V}$ linear maps. |