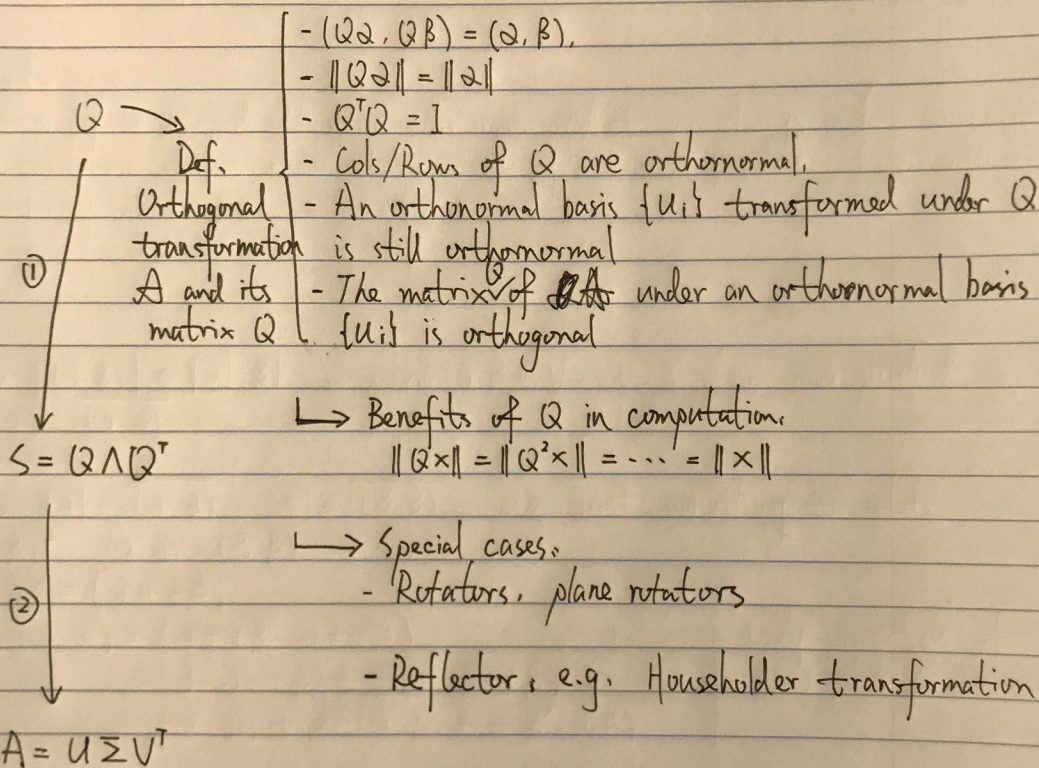


- Orthogonal matrices, eigenvalues / eigenvectors, singular value decomposition

7. References:

- [1]. 北大《高等代数》, Sec 9.4, 正交变换.
- [2]. David Watkins, "Fundamentals of Matrix Computations".
- [3]. Gilbert Strang, "A 2020 Vision of Linear Algebra".



①. For a symmetric real matrix S , if $Sx = \lambda x$, $Sy = \mu y$, $\lambda \neq \mu$, then $x \perp y$ (or $(x, y) = 0$).
 So $SX = X\Lambda \Rightarrow S = Q\Lambda Q^T$

② A can be a rectangular $m \times n$ matrix, $A^T A$ is symmetric, non-negative definite matrix, so $A^T A = Q\Lambda Q^T$.