Problem Set 01
Deadline: 04 October 2020

Problem 1:
We have $\boldsymbol{u}$ and $\boldsymbol{v}$ are **orthogonal unit** vectors. Show that $\boldsymbol{u} + \boldsymbol{v}$ is orthogonal to $\boldsymbol{u} - \boldsymbol{v}$.

Problem 2:
Prove that nullspaces $\mathbf{N}(A^\top A) = \mathbf{N}(A)$.

Problem 3:
If $\mathbf{C}(A) = \mathbf{C}(A^\top)$ (column space of A = row space of A), does A have to be symmetric? Explain.

Problem 4:
A is a square matrix. Is it always true that $\mathbf{N}(A^2)$ =$\mathbf{N}(A)$? Explain.