Southern University of Science and Technology
Linear Algebra I Final Examination-Solutions
Fall, 2020

Instructor: Prof. Dong Chen
Division of Math, Department of Mathematics, Time: 2h
Lecture 02 (prof. Dong Chen), Lecture 03 (Dr. Yuchen Zhang)

(1) (5 points, 2 correct each) True or false. No need to justify.

(a) The diagonal elements of a symmetric matrix are all nonzero positive definite matrix are positive.

Solution: False, it is enough to let, $diag(-1, 1, 1)$.

(b) If A and B are diagonalizable, so is AB.

Solution: False, $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$.

(c) If A is symmetric, then all the upper left submatrices A_k of A have negative determinants.

Solution: False, A is not a matrix, then the number of square dimensions of A is enough, the multiplication is equal to the sum of A.

(d) Projection, 2 points each (True or false)

(i) If P is a projection matrix, then P is invertible. (Hint: P is a projection matrix, then $P^2 = P$ and $P^T = P$ and $P^2 = P$ and $P^T = P$ and $P^2 = P$ and $P^T = P$ and