

EE555 Advanced Linear Systems

Homework #2

Homework Problems

Due Wednesday, Feb. 2 at the beginning of class.

Chapter 2: Problems 1, 5, 8, 11, 15, 20

Presentation Problems

Presenters will be chosen at random at the beginning of class, Wednesday, Feb. 2. Presentations will be held at Presentation Session #2, Thursday, Feb. 3.

Chapter 2:

Problem	2	_____
	3	_____
	4	_____
	6	_____
	7	_____
	10	_____
	12	_____
	13	_____
	14	_____
	17	_____

Bonus Problem

Chapter 2, Problem 9. We will divide up +5 points on the final grade among all correct proofs, e.g., if there is only one correct proof, the author will receive all +5 points; if there are 20 correct proofs, each author will receive +0.25 points. There is no partial credit.

Notes

- ❖ Some of the determinant calculations will require a factorization of the matrix of interest, $\mathbf{A} = \mathbf{X}\mathbf{Y}$ and subsequent application of $\det(\mathbf{A}) = \det(\mathbf{X})\det(\mathbf{Y})$ where it is assumed $\det(\mathbf{X})$, $\det(\mathbf{Y})$ are simple determinants to compute, i.e. \mathbf{X} , \mathbf{Y} are triangular. Also, some matrices can be written in certain forms, such as $\mathbf{A} = \mathbf{B}\mathbf{B}^T + \mathbf{x}\mathbf{x}^T$ for which we can use results from Chapter 1 problems.
- ❖ Some of the determinant calculations can be approached by finding a matrix, \mathbf{B} such that $\det(\mathbf{A}\mathbf{B})$ and $\det(\mathbf{B})$ are easy to compute. Then $\det(\mathbf{A}) = \det(\mathbf{A}\mathbf{B}) / \det(\mathbf{B})$.

- ❖ Some of the determinant calculations can be approached with an inductive reasoning, i.e. compute the determinant for $k = 1$ (or 2). Assume the determinant for $k = n - 1$. Compute the determinant for $k = n$.