Math 2114: Intro Linear Algebra : Fall 2023 : Poole 4e

Note: Each unit covers 2 weeks of class lectures.

$*$ Problem available on WebAssign only.

$^{+}$ col(A) only.

$^{++}$ col(A) and null(A) only.

Unit 1 : Vectors, Linear Systems, Matrices		
Section	Topic	Homework
1.1	The Geometry and Algebra of Vectors.	Written Section 1.1: 1a, 1d, 18, 19, 21, 22, 23e, 24e, Larson, Section 4.1: 41, 44 Online Section 1.1: 2, 3, 7, 9, 12, 13, 15
2.1	Introduction to Linear systems.	Written Section 2.1: 2, 4, 6, 20, 25, 34, 40a Online Section 2.1: 11, 14, 15, 21, 24
1.2	Length and Angle: The Dot Product.	Written Section 1.2: 8, 14, 17, 55, 60, 61, 63, Larson, Section 5.1: 75, 76, 83 Online Section 1.2: 1, 3, 5, 11, 13, 30, 48, 49, 66
3.1	Matrix Operations.	Written Sect. 3.1: 2, 7, 8, 13, 14, 16, 17, 18, 19, 20, 22, 26, 35 Online Section 3.1: 3, 4, 5, 9, 21, 23, 503*, Larson, Section 2.2: 27, 29
3.2	Matrix Algebra.	Written Section 3.2: 4, 18e, 20, 22, 23, 26, Larson, Section 2.2: 41, 45, 61, 69 Online Section 3.2: 3, 24, 36, Larson, Section 2.2: 23, 25
Unit 2 : Solving Linear Systems, Span, Linear Independence		
Section	Topic	Homework
2.2	Direct Methods for Solving Linear Systems.	Written Section 2.1: 31, Section 2.2: 8, 12, 16, 19, 25, 26, 28, 29, 30, 41, 42, Larson, Section 2.1: 40, 43, 44, 49, 50 Online Section 2.1: 28, Section 2.2: 3, 14, 17, 23, 27, 33, Larson, Section 1.2: 10, 43, 49, Section 2.1: 37, 39, 45, 51
2.3	Spanning Sets and Linear Independence.	Written Section 2.3: 2, 4, 8, 10, 12, 14, 18, 19, 23, 24, 26, 28, 42a, 44, p134: 1, Section 3.1: 29 Online Section 2.3: 1, 3, 7, 15, 17, 22, 30, Larson, Section 4.4: 3
Exam 1		

Unit 3 : Matrix Inverses, Subspaces, Basis, Dimension		
Section	Topic	Homework
3.3	The Inverse of a Matrix.	Written Section 3.3: 2, 4, 22, 42a, 43a, 52, 53, page 252: 1a-c, 8, 9, Larson, Section 2.3: 19 Online Sect. 3.3: 1, 12, 21, 57, Larson, Sect. 2.3: 3, 41, 56
3.5	Subspaces, Basis, Dimension, and Rank.	Written Section 3.5: 3, 4, 6, 7, 12^{+}, 16, 17^{++}, 19^{++}, 27, 28, 34, 37, 39, 46, 51, 52, page 252: 1g-h, 13, 14, 17, and find a basis for null(A) where $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{bmatrix}$. Online Section 3.5: 11^{+}, 18^{++}, 29, 30, 35, 36, 38, 41, 42
Unit 4 : Linear Transformations, Markov Chains, Eigenvalues and Eigenvectors		
Section	Topic	Homework
Poole 3.6 & Larson 6.2	Introduction to Linear Transformations, Kernel and Image of Linear Transformations	Written Section 3.6: 5, 6, 8, 10, 13, 14, 20, 24, 33, 37, 53, 54, page 252: 1i-j, 18, Larson, Section 6.2: 48, 50-54, 60a-e Online Section 3.6: 2, 9, 12, 21, 32, 51, Larson, Section 6.1: 25, 29
3.7	Markov Chains.	Written Section 3.7: 9, 10, Larson, Section 2.5: 6, 8 Online Section 3.7: 1, 3, 4, Larson, Section 2.5: 1, 4, 7, 12
4.1, App. C	Introduction to Eigenvalues and Eigenvectors.	Written Section 4.1: 4, 5, 8, 10, 19, 22, 23, 28, 36, 37, 38, and given the complex numbers $w = 2 - 2i$ and $z = 1 + i$, calculate $w + z$, $w - z$, wz, w/z, $\lvert w \rvert$, and $\overline{z}$ Online Section 4.1: 3, 6, 12, 14, 21, 24, 27
Exam 2		

Unit 5 : Determinants, Diagonalization		
Section	Topic	Homework
4.2	Determinants.	Written Section 4.2: 1, 8, 12, 27, 47–52, 53, 54, Larson, Section 3.3: 18 Online Larson, Section 3.1: 19, 21, 48, Section 3.2: 46, 502*, Section 3.3: 33, 39, 72
4.3	Eigenvalues and Eigenvectors of $n \times n$ Matrices.	Written Section 4.3: 2, 4, 7, 8, 10, 15, 16, 17, 18, 22, 23 Online Section 4.3: 3, 5, 6, Larson, Section 7.1: 41
4.4	Similarity and Diagonalization.	Written Section 4.4: 18, 25, 28, 38, and use your work from Sec 4.3: 2, 4, 7, 8, 10 to determine whether A is diagonalizable and if so, give an invertible matrix P and a diagonal matrix D such that $P^{-1}AP = D$ Online Section 4.4: 6, 11, 24, 503*, 504*
Unit 6 : Orthogonality, Least Squares		
Section	Topic	Homework
5.1	Orthogonality in $\mathbb{R}^n$	Written Section 5.1: 2, 6, 7, 8, 10, 13, and Larson, Section 5.3: 11, 12 Online Section 5.1: 3, 9, 11, Larson, Section 5.1: 75, 77, Section 5.3: 6, 10
5.2	Orthogonal Complements and Orthogonal Projections	Written Section 5.2: 4, 10, 11, 16, 18 Online Section 5.2: 6, 9, 12, 15, 17, 21, 504*
5.3	The Gram-Schmidt Process and Orthogonal Projections	Written Section 5.3: 3, 8, 10, page 426: 17 Online Section 5.3: 5, 6, 7, 9
7.3	Least Squares	Written Section 7.3: 4, 8, 20, 22, 30 Online Section 7.3: 1, 3, 6, 7, 19, 36
Exam 3		