

Math 5327 Assignment 8, due Friday, March 28th.

- (1) Read 5.6 - 5.9, and 5.13.
- (2) Ungraded problems: 5.4.6, 5.4.12, 5.5.6, 5.5.11, 5.6.6, 5.6.9, 5.6.10, 5.6.14, 5.9.13, 5.9.17
- (3) Find a set of three polynomials $\{p_0(t), p_1(t), p_2(t)\}$ with real coefficients such that the degree of $p_i = i$ and the set is orthonormal with respect to the inner product $\langle f|g \rangle = \int_0^2 f(t)g(t)dt$.
- (4) Find the least squares 'solution' to
$$\begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix} x = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$
- (5) Let x be a m -vector and A a $m \times n$ matrix over \mathbb{C} . For each of the following, prove the inequality and give an example of a matrix or vector for which equality is achieved:
 - (a) $|x|_\infty \leq |x|_2$
 - (b) $|A|_\infty \leq \sqrt{n}|A|_2$
 - (c) $|A|_2 \leq \sqrt{m}|A|_\infty$