Math 2802 N1-N3 Quiz
March 30th, 2018

The quiz has a total of 10 points and you have 15 minutes. Read carefully and clearly justify how you obtained your answers.

1. [6 points] Let $A = \begin{pmatrix} 2 & 0 \\ -1 & 1 \\ 0 & 2 \end{pmatrix}$ and $b = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$. The least-square solution to $Ax = b$

   is $\widehat{x} = \begin{pmatrix} 1/3 \\ -1/3 \end{pmatrix}$. Compute the error associated to this least-squares solution.

   (*Hint: The error is the distance between two vectors*)

2. [4 pts] Consider a best fit parabola $y = \beta_2 x^2 + \beta_1 x$ for the following data points. Provide a design matrix A and observation vector y so that the least-squares solution to $A\begin{pmatrix} \beta_1 \\ \beta_2 \end{pmatrix} = y$ gives the paramaters β_1, β_2. (*Do not solve the least-squares problem*)

x	1	2	3	4	5
y	2.8	3.7	4.6	4.8	5.2