MATH 8600 (FALL 2018) HOMEWORK 4

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Assigned 10/12/2018, due 10/22/2018 by 5pm in my office.

1. **Prob 5.22, 5.23, 5.24, 6.4, 6.5, 6.6(b)**

   Note that for 6.4(b), please add one column of data: $i = 4$, $t_i = 3.0$ and $z_i = e^{\pi}$. Also, some of you might have $v(t) = x_1 + x_1 t$, where the second x_1 should be x_2.

2. Write a MATLAB QR code using modified Gram-Schmidt orthogonalization discussed in class. Calculate the number of floating point operations needed (assuming $A \in \mathbb{R}^{n\times m}$ is fully dense), and test it on two matrices

   ```
   A1 = rand(10000,45);
   ```

   and

   ```
   A = fliplr(vander(linspace(-1,1,10000)));
   A2 = A(:,1:25); A3 = A(:,1:45);
   ```

   Check the 2-condition number of A_i, $\|Q^TQ - I\|_2$ and $\|QR - A_i\|_2/\|A_i\|_2$, for each of the three matrices, respectively. Draw conclusions from the numerical results.