MATH 2331 - Linear Algebra - Spring 2018
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Homework 6 - due Monday 03/19

Instructions:

• Print out this page as a cover one.
• Write your name and PSID in the spaces provided above.
• Your homework must be complete, neatly written, and stapled.
• Use a pen or a dark pencil.
• For the MATLAB exercises, send the scripts to yushutin@math.uh.edu. For homework \( n \), write “lastname, firstname - homework \( n \)” as the subject of your email. Call “lastname_hwn_1” the script generated for exercise 1, “lastname_hwn_2” the script generated for exercise 2 and so on, where lastname is your last name.

Exercises from the book:

- Section 2.2: exercises 6, 9, 11, 20, 30, 31.
- Section 2.3: exercises 4, 11, 24, 34.
- Section 3.1: exercises 4, 19, 20, 24, 37

MATLAB exercises:
Create a script for the following exercises:

1. In homework 2, Matlab ex. 2, you were asked to solve system \( Ax = b \) with

   \[
   A = \begin{bmatrix}
   31 & -8 & 11 \\
   -8 & 15 & -6 \\
   11 & -6 & 25 \\
   \end{bmatrix}, \quad b = \begin{bmatrix}
   8 \\
   -4 \\
   13 \\
   \end{bmatrix}.
   \]

   using command \texttt{rref} and print on screen \( Ax - b \), which is called error. Now, use \( \backslash \) and compare the error.

2. Find the determinant of the Hilbert matrix of size \( k \) (command \texttt{hilb(k)}), for \( k = 1,2,\ldots,10 \). Plot the determinant as a function of \( k \) using the logarithmic scale for the vertical axis.
3. Let $A$ be the $100 \times 100$ matrix given by:

$$A = \begin{bmatrix}
3 & -2 & 0 \\
-1 & 3 & -2 \\
\ddots & \ddots & \ddots \\
-1 & 3 & -2 \\
0 & -1 & 3
\end{bmatrix}.$$ 

Find the determinant of $A$. 