You may freely collaborate on section problems. They are not collected. Solutions are discussed in section and posted on the website. For maximum benefit, it is best to actually write MATLAB solutions and run them. Section problems and their variations can appear on course examinations. Problems are generally taken from *Introduction to Scientific Computing-A Matrix-Vector Approach Using Matlab* by C. Van Loan.

P1.4.5

On a base-2 machine, the distance between 7 and the next largest floating point number is $2^{-12}$. What is the distance between 70 and the next largest floating point number?

P1.5.3

Write a MATLAB function `Ellipse(P,A,theta)` that plots the “tilted” ellipse defined by

$$
x(t) = \cos(\theta) \left[ \frac{P - A}{2} + \frac{P + A}{2} \cos(t) \right] - \sin(\theta) \left[ \sqrt{A \cdot P} \sin(t) \right]
$$

$$
y(t) = \sin(\theta) \left[ \frac{P - A}{2} + \frac{P + A}{2} \cos(t) \right] + \cos(\theta) \left[ \sqrt{A \cdot P} \sin(t) \right]
$$

for $0 \leq t \leq 2\pi$. Your implementation should not have any loops.

P1.6.3

The Chebychev polynomials are defined by

$$
T_k(x) = \begin{cases} 
1 & k = 0 \\
x & k = 1 \\
2xT_{k-1}(x) - T_{k-2}(x) & k \geq 2
\end{cases}
$$

Write a function `T = ChebyCoeff(n)` that returns an `n`-by-1 cell array whose `i`th cell is a length-`i` array. The elements of the array are the coefficients of $T_{i-1}$. Thus `T{3} = [-1 0 2]` since $T_2(x) = 2x^2 - 1$. 

CS 322: Section Assignment 2

Week 2: January 30 - February 3