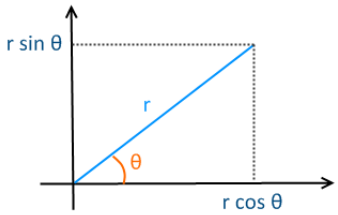
Summer 2014 MATLAB Assignment 4

Work the following problems (NOTE: these are RELATED TO the corresponding page and problem number from Gilat. Do NOT work the actual problems from the Lab Manual, or you will receive NO CREDIT!)

1. **g249x04** (function files: pp220-223; using function files: p226):
   Write a user-defined function that converts speed given in units of kilometers per hour to speed in units of feet per second. For the function name and arguments, use $fps = kmphTOfps(kmph)$. The input argument is the speed in km/h, and the output argument is the speed in ft/s. Use the function to convert 70 km/h to units of ft/s.

2. **g249x08** (Anonymous functions: see pp230-232):
   The weight W of a ring in a shape of a torus with an inner radius r and diameter d is given by $W = \gamma\frac{1}{4}\pi^2(2r+d)d^2$, where γ is the specific weight of the ring material. Write an anonymous function that calculates the weight of the ring. The function should have three input arguments r, d, and γ. Use the anonymous function to calculate the weight of a gold ring ($\gamma = 0.696$ lbs/in^3) with $r = 0.6$ in., $d = 0.092$ in.

3. **g253x21** (function files: pp220-223; using function files: p226; if-elseif-else statements: pp184-187):
   Write a program in a function file that converts Cartesian coordinates (x, y) to Polar coordinates (r, θ) (See figure below and section 13.4 in Stewart). For the function name and arguments use $[r\ th] = Cart2Pol(x, y)$ where the input arguments are the Cartesian coordinates and the output arguments are the polar coordinates where $r \geq 0$ and $-\pi \leq th \leq \pi$. NOTE that the arctan command ONLY gives values between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ so you must have the program adjust this value when the point is in quadrant II or III! Use the function to find the polar coordinates of the following points:
   a) $(15, 3)$ b) $(-7, 12)$ c) $(-17, -9)$ d) $(10, -6.5)$.



4. **g259x37** (function files: pp220-223; using function files: p226, semilog plots: pp149-150):
   Write the function described in the problem and use it to plot RV as a function of ω for $10^{-2} \leq \omega \leq 10^7$ (using logarithmic axes on the ω-axis) for the following 2 cases (pay attention to units!!!):

   (a) $R = 1100\Omega,\ C = 300\mu F,\ L = 4\,mH$

   (b) $R = 500\Omega,\ C = 9\mu F,\ L = 700\,mH$