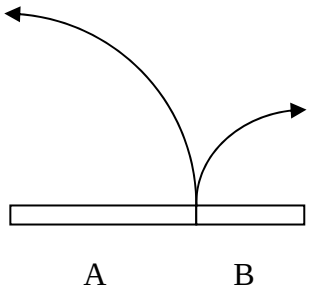
ECOR 2606 Lab Test #1 Practice Material



A motorized door has two unequal parts (see diagram). One part of the door is *A* metres wide and the other is *B* metres wide. At time t = 0 the "open" button is pressed and both parts start swinging open at a rate of 2 degrees/second. Movement stops after 45 seconds (i.e. when both doors are fully open).

Write a function m-file (door.m) that given *A*, *B*, and *t*, calculates and returns the distance between the ends of the two parts of the door. Have your function generate an error if it is given unreasonable inputs.

Hint: Start by deriving expressions for the x and y co-ordinates of the ends of the door parts as functions of the opening angles of the doors. Use the left-hand side of door A as the (0,0) point in the Cartesian plane.

Write a script file (script.m) that performs the following calculations:

Suppose that A is 5m and B is 3m. At time *t* = 0 seconds the ends of the doors are 0m apart. Plot the distance between the ends of the doors for *t* from 0 to 45 seconds. Do this using both *plot* and *fplot*.

At what time *t* will they be 5m apart? Use fprintf to display the answer.

Note: All trigonometric functions work in radians.