Assignment 2b

Nusrat Hossain

Problem 1 Billiard Ball

a) In this model the movement of billiard ball is designed. A hybrid state chart is used here with three different function. In the function initialize position, velocity of the ball and table length and table width are initialized. Through Boundary_position function it checks where is the ball and through Reset_position function it reset the position if the ball crossing the boundary. As instructed, it ignore holes.

b) As instructed 4 corners of the table has holes so in this model a new function is added which checks ball is pocketed to hall or not. In the initialize function it also adds the hole size as 0.05 m. So, when any ball is pocketed to hole it remains in the hole as instructed until the simulation is stopped. If it does not go to hole, then through Boundary_position function of it checks where is the ball and through Reset_position function it reset the position if the ball crossing the boundary.

C) A graphical plot is added by MATLAB function plottable to show the movement of the billiard ball.

Problem 2 Elevator Controller

a) In this model two blocks are there. One is elevator and other is controller. In the elevator block it takes speed as input from control block and gives position as output through using a simulink Function named speedtoposition. In speedtoposition function an integrator block**(discrete or continuous)-**Library:Simscape / Electrical / Control / General Control is necessary to be installed) is used which takes speed as input and gives position as output.A data type conversion block is used which gives the position value from 1 to 4.

In the controller block position is taken as input data from elevator through a delay block and several input events floor_1, floor_2, floor_3, floor_4, reset and emergency are taken. Inside controller block there are four state for four floors. A MATLAB function named controllerlogic is used to control speed of the elevator and based on position input from the elevator block different states are changed. When an emergency is pressed the elevator goes to floor_1. A reset button is there to restart after an emergency. Door indicator is red when any door opens. Lamp for each floor is there to show which floor is called by user.

b) An animation is created for elevator which only shows the output of the elevator positions,the doors and states of the lamps that takes input from buttons of Simulink model. A matlab function named lift_fig is used to implement the animation which is called in controller block.