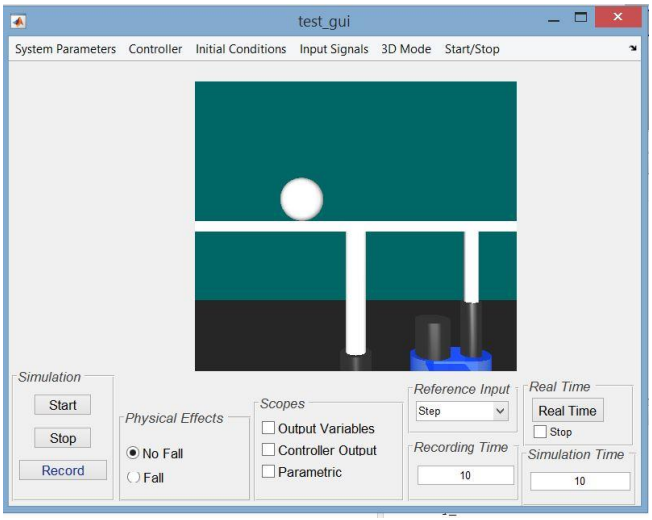
Instructions

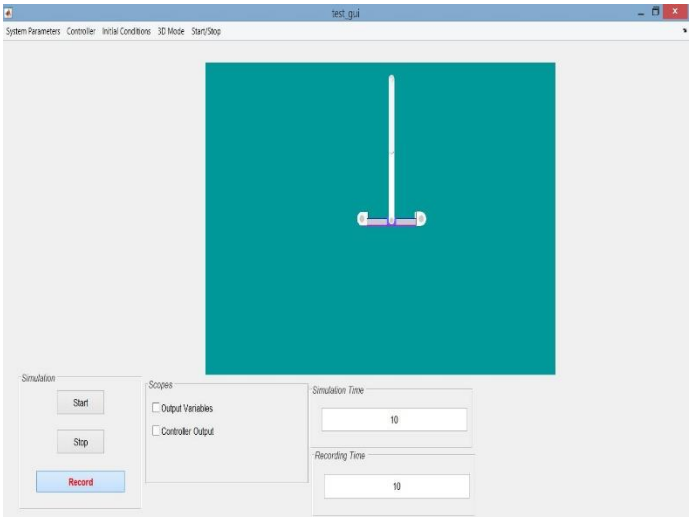
Requirements

PC with MATLAB installed and Simulink 3D Animation Toolbox

Launching and Starting the Simulation

1. Open MATLAB
2. Navigate to the folder where the projects files are or add folder to path
3. To launch the ball and plate system, type: test_gui. To launch the double inverted pendulum system, type DIP_gui (after the models are launched the Simulink files can be opened at the users discretion: B&P: ballonplate_correctordinates.slx, DIP: pendulumgui.slx
4. Press the Start button to run the Simulation and the Stop button to stop the simulation prematurely

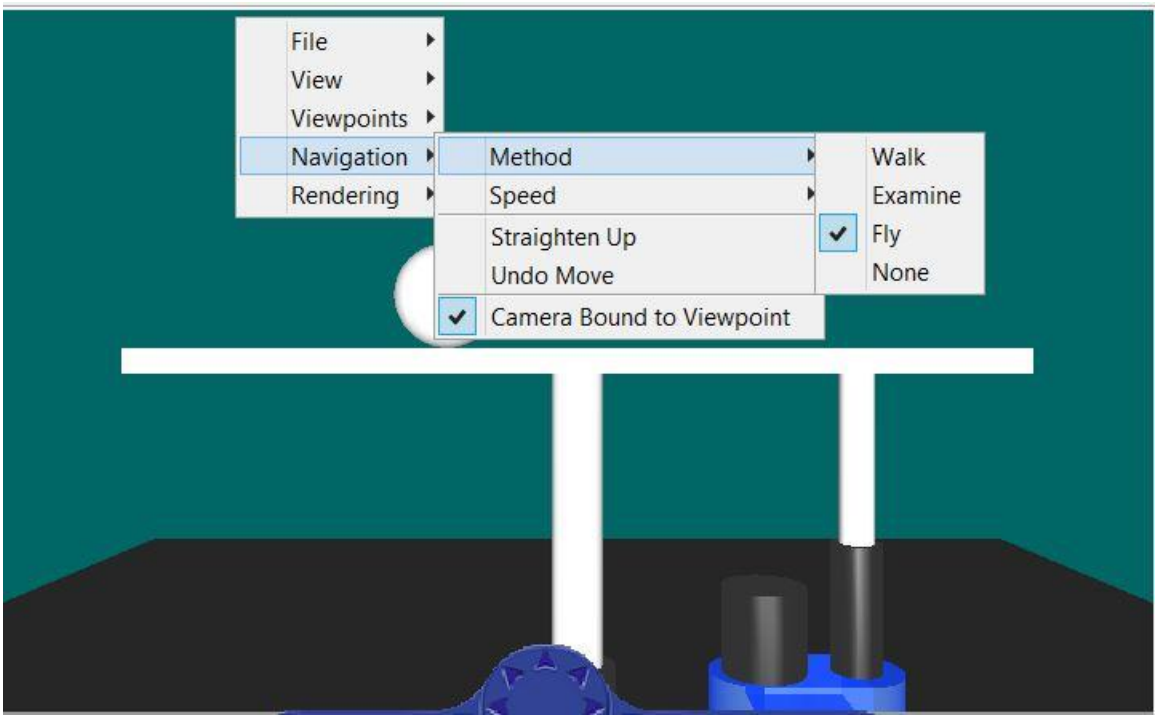




Navigating the VRML Models

To navigate the VRML models right click on the 3D model and click navigation and method. There are several ways to navigate:

- Walk
- **Examine – Choose this one and left click and hold the house to rotate around the model**
- Fly



Features & Changing Model Parameters

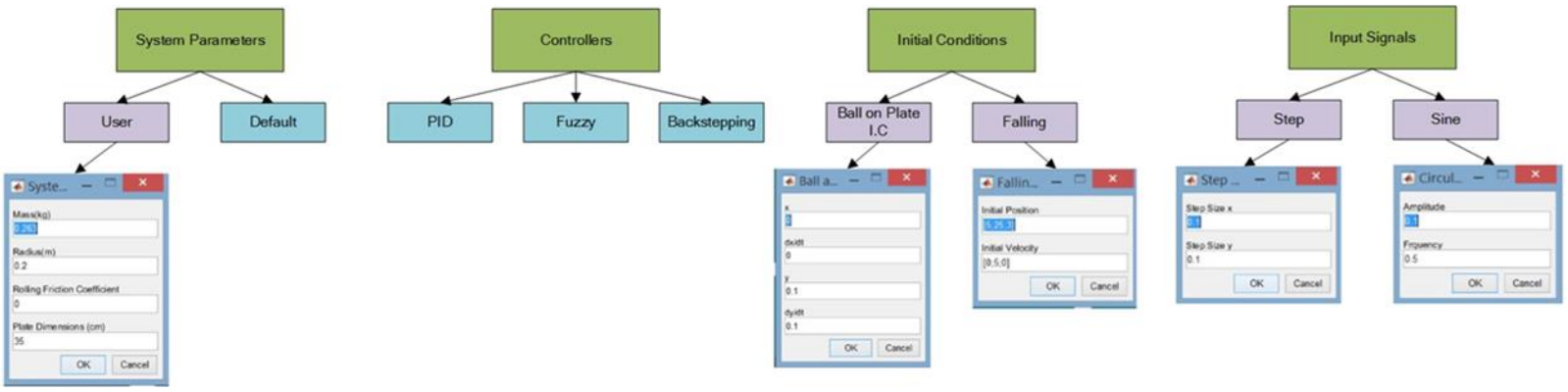
General

- Record Button – This button records the simulation and save it to a VRML file for external viewing on any VRML viewer
- The Scopes panel allows the viewing of different scopes, output variables, controller output and a parametric XY plotter (for B&P), which plots in real time.
- Recording time selects the recording time of the recorded VRML file. The filename for the recorded ball and plate files are: bandplate_move_correctordinates_anim_x.wrl where x is the animation number in the folder. The filename for the recorded DIP animations are: Double_Inverted_Pendullum_updatedx.wrl
- Simulation time selects the simulation time

Ball and Plate

- The physical effects panel allows the selection of bouncing and no bouncing
- The real time button allows the animating of the 3D model when the physical system is connected
- Reference input selection, selects between a circular trajectory or a step reference input

- The menu button layout is shown below, it consists of changing the system parameters



such as mass of the ball, friction and plate dimensions, controller selection, initial conditions and inputs signal parameters.

Double Inverted Pendulum

- The menu bar for the double inverted pendulum allows the modifying of the system parameters and the controller selection, swing up and stabilizing