CHAPTER 1

Hardware-Equivalent Dynamics Model

The physical model of the two-wheeled inverted pendulum is depicted as a set of isometric and multiview projections in Figures **??** - **??**,

3-dimensional

1.1 Nonlinear model

The motion equations of the two-wheeled inverted pendulum can be derived by using the Lagrangian method. This based on the coordinate system in Figure 3-2. If the direction of two-wheeled inverted pendulum is x-axis positive direction at t=0,eachcoordinatesaregivenasthefollowing.

1.1.1 Wheel

1.1.2 Body

1.1.3 Robot

1.2 Linear model

1.2.1 State-space Representation

The plant model was derived in **REF:thesis:masters:2012-peltier**