$$\begin{array}{rclrcl} x^2 + y^2 & = & 1 \\ x\dot{x} + y\dot{y} & = & 0 \\ \dot{x}^2 + x\ddot{x} + \dot{y}^2 + y\ddot{y} & = & 0 \\ \ddot{x} & = & Fx \\ \ddot{y} & = & Fy - 9.81 \end{array}$$