Mathematical modeling

Physical problem
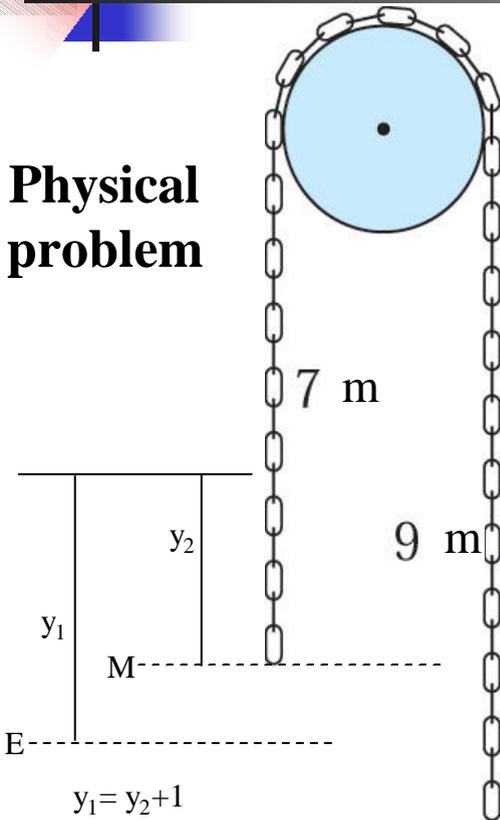
		y_1 **system**	y_2 **system**
		Equilibrium (E)	Max point (M)
	2nd order ODE	$16\ddot{y}_1 = 2\times9.8\times y_1$ $y_1(0)=1$ $y_1'(0)=0$ (exam)	$16\ddot{y}_2 = 2\times9.8\times(y_2+1)$ $y_2(0)=0$ $y_2'(0)=0$ (HW)
	1st order ODE	$v_1\dfrac{dv_1}{dy_1}=1.23y_1$ $\dfrac{dy_1}{dt}=1.11\sqrt{y_1^2-1}$ (exam)	$v_2\dfrac{dv_2}{dy_2}=1.23(y_2+1)$ $\dfrac{dy_1}{dt}=1.11\sqrt{y_1^2+2y}$ (HW)
	Comments	2nd order ODE (homogeneous ODE) (non-homogeneous BC)	2nd order ODE (non-homogeneous ODE) (homogeneous BC)
		$\displaystyle\int\frac{1}{\sqrt{y^2-1}}dy=\cosh^{-1}(y)$	v_{es}=8.80 m/sec t_{es}=2.5 sec

Figure 1.16 *Chain on a pulley* (　　　NOV. 1/2003　　　chain03.ppt /　　　)