



$$L = x_2 - x_1$$

$$r = x_1 - x_2$$

$$m \ddot{x}_1 = F_1$$

$$m \ddot{x}_2 = F_2$$

$$F_2 = -D(x_2 - x_1 - L_0)$$

$$F_1 = +D(x_2 - x_1 - L_0)$$

$$m \ddot{r} = m(\ddot{x}_1 - \ddot{x}_2) = F_1 - F_2 = 2F_1 = 2D(x_2 - x_1 - L_0) = 2D(\underbrace{x_2 - x_1}_{=r} - L_0)$$

$$m \ddot{r} = -2D(r + L_0)$$