Damped, Driven, Coupled Oscillators

Apply $F_{\text{damp}} = -b\dot{x}$ to both bobs,

$F_{\text{drive}} = F_0 \cos \omega_d t$ to left bob only.

The normal modes respond independently to the drive, with the effective amplitude of the drive force given by $F_0 / \sqrt{2}$.

i.e.

$$S_p = A_p(\omega_d, \frac{F_0}{\sqrt{2}}) \cos \left[ \omega_p t + S_p(\omega_d) \right]$$

$$S_b = A_b(\omega_d, \frac{F_0}{\sqrt{2}}) \cos \left[ \omega_b t + S_b(\omega_d) \right]$$

$$x_1 = \frac{1}{\sqrt{2}} (S_p + S_b) \Rightarrow \text{amplitude of } x_1$$