

# Project introduction, parametrically driven oscillators

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# Project outline

## Swing

- ▶ Explain physics
- ▶ Governing equation:  
$$l\ddot{\phi} + 2l\dot{\phi} + l_0\omega_0^2 \sin(\phi) = 0.$$
- ▶ Would be interesting to study:  
$$l(\phi) = l_0 \left[ 1 + \cos(a\phi) \right]$$
- ▶ Form of solutions

## Circadian Rythms

- ▶ Explain the biology
- ▶ Entrainment
- ▶ Phase reduction technique
- ▶ Phase response curve
- ▶ Robustness