11.1) Kicked Rotor

The simplest systems that exhibit chaotic motion are not systems with 2 dof but systems with 1 dof that are kicked periodically.

\[ H_0 = \frac{J^2}{2I} \]

A force \( F \) is applied at \( t = 0, \ T, \ 2T, \ 3T, \ldots \)

\[ \tau = F \cdot \ell \sin \phi \]

No gravity

\[ J = 0 \]

\[ \frac{d\phi}{dt} = \tau \]

\[ \frac{\phi_{n+1} - \phi_n}{T} = \frac{\phi_{n+1} - \phi_n}{\frac{T}{2}} \frac{\phi_{n+1} - \phi_n}{T} \]

\[ \phi = \frac{\phi_{n+1} - \phi_n}{T} \]

\[ \phi_{n+1} = \phi_n + \frac{\tau_{n+1} T}{I} \mod 2\pi \]

Choose units with \( \frac{1}{I} = 1 \)