Lecture # 40  
12-16-2007

Canonical pt  
1 dof \( \frac{\partial \xi}{\partial \phi_0} \) \( \xi = \langle \chi_i \rangle - \mathbf{V}_i (\phi_0, \tau) \) 

Many dof \( \xi (\phi_0, \{ m_i \}) = \frac{\mathbf{V}_i (\phi_0, \{ m_i \})}{\sum m_i \mathbf{V}_0} \) 

Divergent for commensurate frequencies

**Poincaré-Birkhoff** : Under a perturbation, fixed points split into an equal number of alternating elliptic and hyperbolic fixed points.

Kicked rotor \( Z \) : \( \phi_{n+1} = \phi_n + 2\pi \xi + \tau \)  
\( T_{n+1} = T_n + 2\Delta t \) 

\( \varepsilon = 0 \) \( \tau = \frac{2\pi \xi}{\Delta t} \) is fixed point.

\( \varepsilon \rightarrow \infty \) \( \tau \) PB +\( \varepsilon \) Homoclinic tangling