Homework Assignment 2

Due date: Sunday, April 12.

1. Questions 1 and 2 from Chapter 3 of Meyer et al. book (page 66).

2. Consider again the torqued pendulum:

$$\dot{x} = p \qquad \dot{p} = -\omega_0^2 \sin x + b, \qquad (x, p) \in T \times R$$

   (a) Find the fixed points

   (b) Find the linearized equations near the fixed points

   (c) Find the eigenvalues and, when possible, eigenvectors of the linearized systems.

   (d) Draw the local phase portraits near these fixed points.

3. Draw the local energy-momentum diagram in the (H, H_1) space for the two linear center-center cases; let $H_i = \frac{1}{2}\omega_i^2(p_i^2 + q_i^2)$ and consider the two cases a)$H = H_1 + H_2$ and b) $H = H_1 - H_2$.

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