Mecánica Clásica
Tarea 10: Teoría Canónica de Perturbaciones

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Problema 1 *Anharmonic oscillator with q^3 perturbation*

For the anharmonic oscillator with a q^3 perturbation

$$H = \frac{1}{2m}p^2 + \frac{1}{2}m\omega_0^2 q^2 + \frac{1}{3}\epsilon m q^3,$$

1. Find up to second order in ϵ the oscillation frequencies with canonical perturbation theory.
2. What happen if you consider just perturbations up to first order?

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Problema 2 *Harmonic oscillator with variable mass*

A linear harmonic oscillator of force constant k has its mass suddenly increased by a fractional amount ϵ, $\forall\ \epsilon \ll 1$. Use first-order canonical perturbation theory to find the resultant shift in the frequency of the oscillator to first order in ϵ.

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