

HOMEWORK 2

Physics 311 Mechanics Spring, 2003

1. A particle of mass m moves under a potential energy

$$U(x) = \frac{c x}{x^2 + a^2} \quad (1)$$

where $c > 0$. Find the position of static equilibrium and the period of small oscillations about it.

2. The position on a surface of a cone with semivertical angle α is specified by the distance r from the vertex and the azimuthal angle ϕ about the axis. Find the *equation* for $r(\phi)$ that satisfies equations of motion (transfer from $\frac{dr}{dt}$ to $\frac{dr}{d\phi} \frac{d\phi}{dt}$).

The last three problems are from Landau & Lifshitz

- 3. §21, #1
- 4. §22, #1 b
- 5. §23, #2