A Fluctuating Torque[1] NELSON ZAMORANO, ALFREDO GÓMEZ,
Physics Department, FCFM, University of Chile — The existence of a fluctuating
torque generates a wide variety of possible orbits. This situation contrasts with those
examples where the torque vanishes and the angular momentum remains constant.
Here we study a two dimensional example with a logarithmic effective potential
$V(x, y) = \frac{1}{2} m V_o^2 \ln[x^2 + (y/b)^2]$, with a small deviation from the axis symmetry
given by the constant b with $b < 1$. Briefly, the effective potential models the grav-
itational force exerted by the **N** point particles on a test object. This potential is
used to learn about the dynamics of galaxies and among other features, generates
a fluctuating torque which is our main interest here. There is not an analytical
solution for these two equations of motion. A simple numerical approach (provided)
is required. Also, a change on the initial conditions may generate a different shape
for the orbit. This apparently simple potential, represents a challenge for the stu-
dents. We propose it as a good pedagogical tool for reviewing the main concepts of
newtonian dynamics.

Nelson Zamorano
Physics Department, FCFM, University of Chile

Date submitted: 14 Jan 2013   Electronic form version 1.4