Homework 7 for the Physics for OI
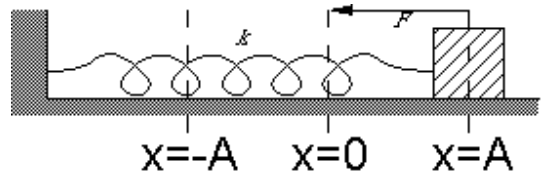
<u>Your tasks:</u>

We have a dynamical system described by a set of equations

$$\dot{x} = v$$
$$\dot{v} = -x - \mu v^3$$

x=-A   x=0   x=A

These equations describe an oscillator with very unusual damping, where the block is moving through a bizarre medium which exerts a force on the block proportional to the *cube* of its velocity.

Depict the **time dependence** of the displacement *x* of such oscillator and draw the **phase portrait**.

Recommended parameters and initial conditions: initial displacement 2 meters, zero initial velocity, μ=0.25 and time scope 0 to 100 seconds.

<u>Additional instructions and hints:</u>

NDSolve, *Plot* and *ParametricPlot* will do the job.