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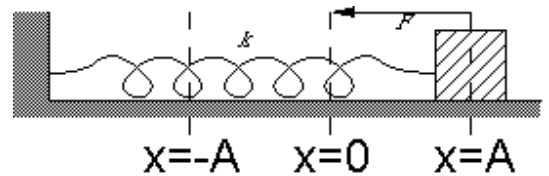
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## Homework 7 for the Physics for OI

### Your tasks:

We have a dynamical system described by a set of equations

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



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,  $\mu=0.25$  and time scope 0 to 100 seconds.

### Additional instructions and hints:

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



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