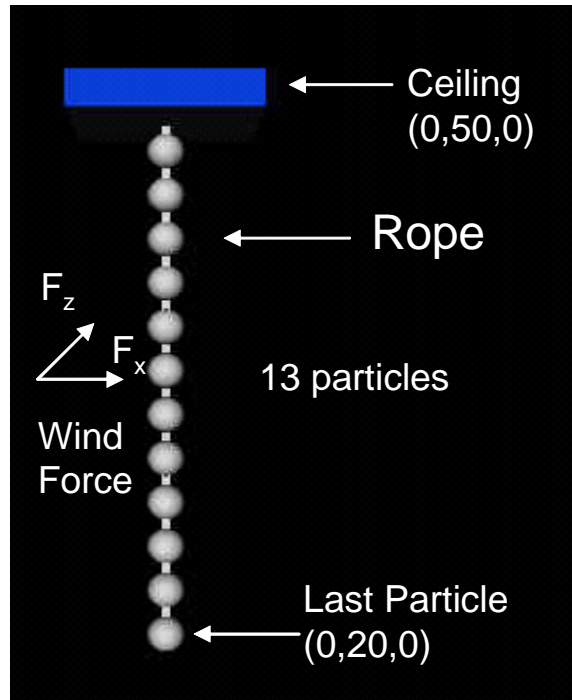# ME 534 COMPUTER-BASED MODELING AND SIMULATION
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3D SIMULATION of a FLEXİBLE OBJECT

Consider a 3D model of a rope hanging from a ceiling. The rope is 30 cm long and made of 13 particles as shown in the figure. The 3D coordinates of the first particle, fixed to the ceiling, and the last particle are given in the figure. Each particle has a mass (m = 1.5 kg) and is attached to its neighbors with a spring (k = 4.6 N/cm) and a damper (b = 2.2 N sec/cm). There is a viscous drag (due to air) acting on each particle opposite to its motion (the coefficient of drag is 0.9). The rope is subjected to time-varying wind forces blowing in the positive-x and negative z-directions as shown in the figure. Simulate the deformable behavior of rope under the effect of user-specified and time-varying wind forces.

Notes:
- Use a keyboard "event" to turn on/of the wind forces during the simulations.
- Use a 3D sphere for graphical representation of each particle.
- Connect the particles to each other using a NURBS (Non-Uniform Rational B-Spline) curve as discussed in Chapter 8 of the Open Inventor programming book (see Example 8-2) so that the visual display of rope will look appealing (see the video clips).