concept of discretization

The basic goal of discretization is to provide an approximation of an infinite dimensional

system by a system that can be fully defined with a finite number of “degrees of freedom”.

To clarify the notion of dimensionality, consider a deformable body in the three-dimensional

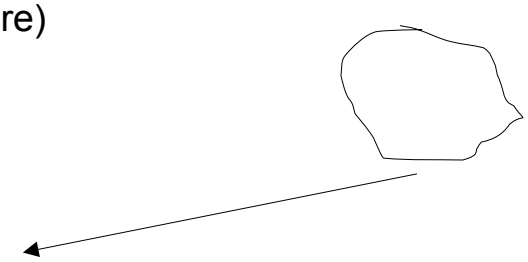
Euclidean space, for which the position of a typical particle with reference to a fixed coordinate

system is defined by means of a vector x, as in Figure. This is an infinite

dimensional system with respect to the position of all of its particle points. If the same body

is assumed to be rigid, then it is a finite dimensional system with only six degrees of freedom.

A dimensional reduction of the above system is accomplished by placing a (somewhat severe)



Structural analogue substitution method

Consider the oscillation of a liquid in a manometer. This system can be approximated

(“lumped”) by means of a single degree-of-freedom mass-spring system, as in Figure

Clearly, such an approximation is largely intuitive and cannot precisely capture the complexity

of the original system (viscosity of the liquid, surface tension effects, geometry of the

manometer walls).

Structural analogue substitution method

Consider the oscillation of a liquid in a manometer. This system can be approximated

(“lumped”) by means of a single degree-of-freedom mass-spring system, as in Figure

Clearly, such an approximation is largely intuitive and cannot precisely capture the complexity

of the original system (viscosity of the liquid, surface tension effects, geometry of the

manometer walls). example of the structural analogue method