



Earthquake Engineering Research Centre
International Institute of Information Technology
Gachibowli, Hyderabad – 500 032, India

Theory:

A plot of the peak value of a response quantity as a function of the natural vibration period of the system, or a related parameter such as circular frequency or cyclic frequency is called the response spectrum for that quantity.

A variety of response spectra can be defined depending on the response quantity that is plotted. Consider the following peak responses:

$$u_o(T_n, \zeta) \equiv \max_t |u(t, T_n, \zeta)|$$

$$\dot{u}_o(T_n, \zeta) \equiv \max_t |\dot{u}(t, T_n, \zeta)|$$

$$\ddot{u}_o(T_n, \zeta) \equiv \max_t |\ddot{u}(t, T_n, \zeta)|$$

The deformation response spectrum is a plot of u_o against T_n for fixed ζ . A similar plot for \dot{u}_o is the relative velocity response spectrum and for \ddot{u}_o is the acceleration response spectrum.

