

CB22. ENGINEERING SEISMOLOGY

EXERCISE No 2

From the PEER ground motion record database <http://peer.berkeley.edu/smcat/> download the record P0176 of the Imperial Valley 1979/10/15 23:16 earthquake.

1. Identify the fault normal component affected by forward directivity.
2. Estimate the velocity pulse period T_p .
3. Calculate and plot the ratio between the 5% damping acceleration spectra of the fault normal and fault parallel components to show the bell shaped amplification curve.
4. For ductility values $\mu=2, 4$ and 6 and 5% viscous damping calculate and plot the ratio between the maximum inelastic and the corresponding elastic displacements for different periods up to $2T_p$ for the fault normal component. Prove that this ratio is equal to μ/q_y .
5. Compare the elastic response spectra of the two horizontal components with the elastic spectra of EC8 for $S a_g = p g_a$ ($p g_a$ = peak ground acceleration of each record) and ground type B.

For this exercise use the SEISMOSIGNAL software which can be downloaded from:
<http://www.seismosoft.com/en/SeismoSignal.aspx>