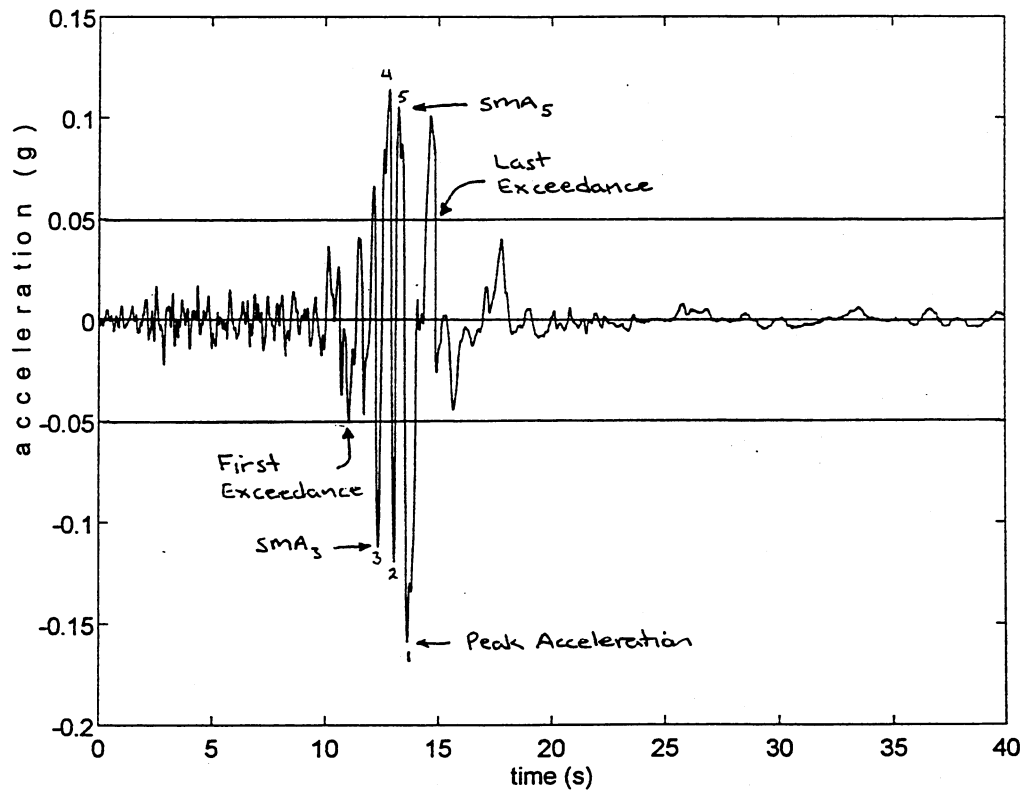


- 3.1 Plot the time history of acceleration and determine:
- The peak acceleration.
 - The sustained maximum acceleration (3rd cycle and 5th cycle).
 - The bracketed duration.

From plot of Treasure Island EW motion (Loma Prieta earthquake) shown below:

- PHA = 0.159 g
- Sustained maximum acceleration: 3rd cycle = 0.114 g
5th cycle = 0.105 g
- Bracketed duration = 3.8 sec

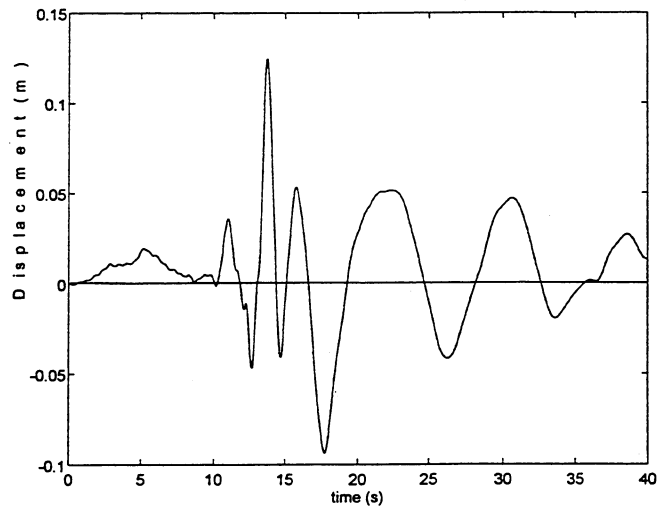
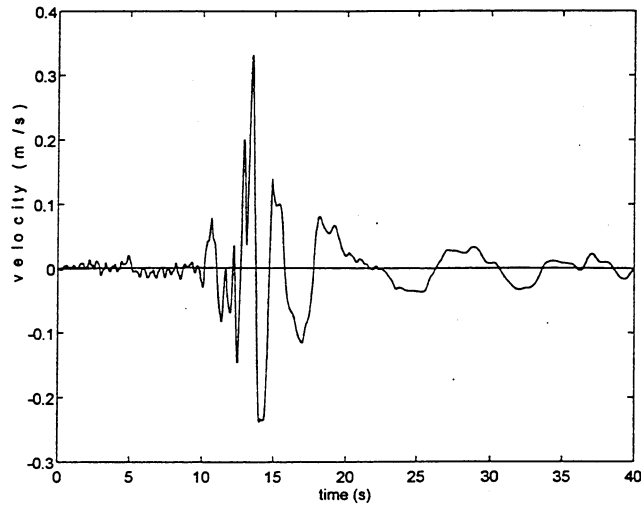


- 3.2 Integrate the time history of acceleration to produce time histories of velocity and displacement. Plot the time histories of velocity and displacement and determine the peak velocity and peak displacement.

Time histories are shown below. Peak values are:

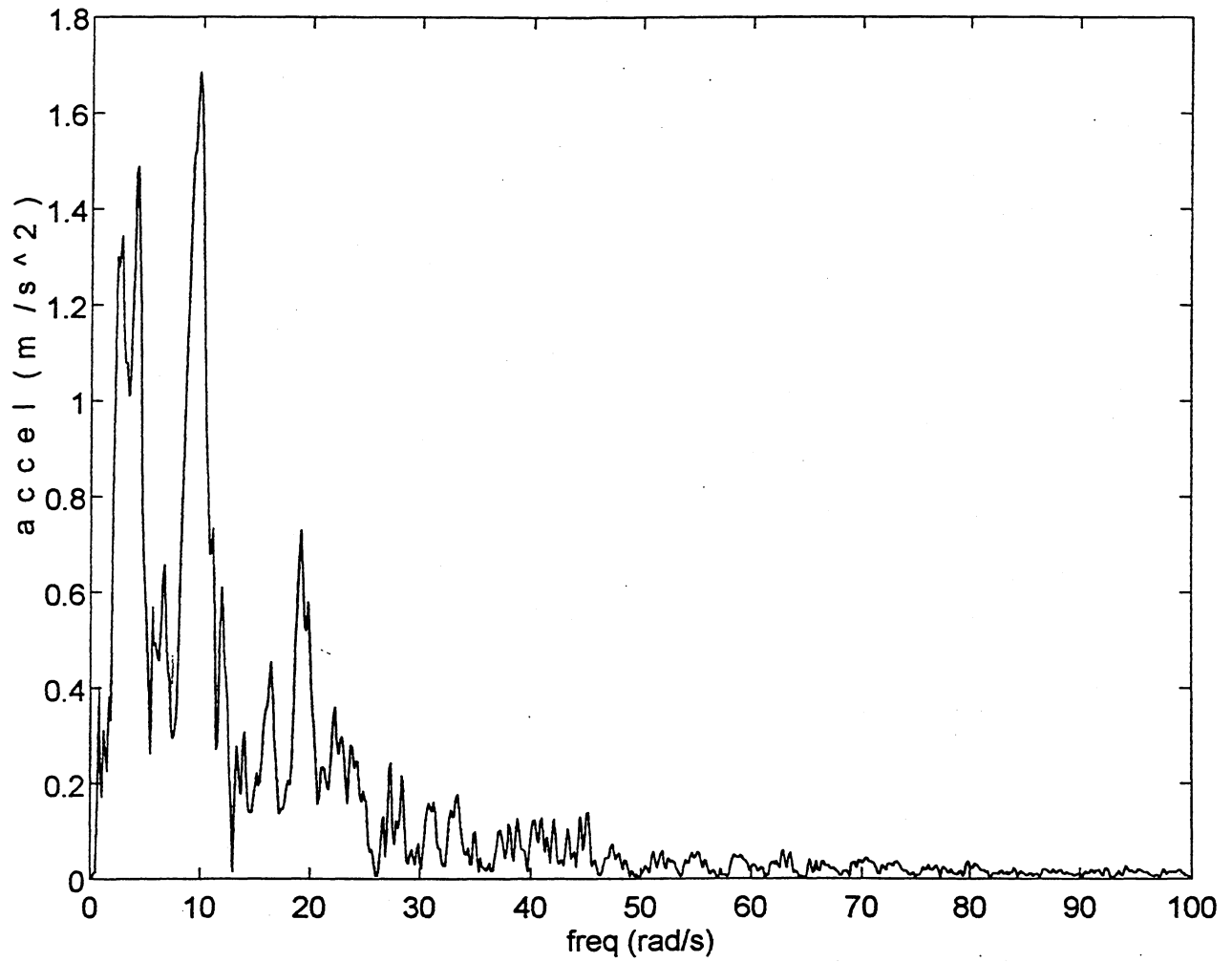
Peak velocity = 0.33 m/sec

Peak displacement = 12.7 cm



3.3 Compute and plot the Fourier amplitude spectrum of the strong motion record.

Plot of FAS (truncated below Nyquist frequency for better visibility of low frequency region) is shown below:

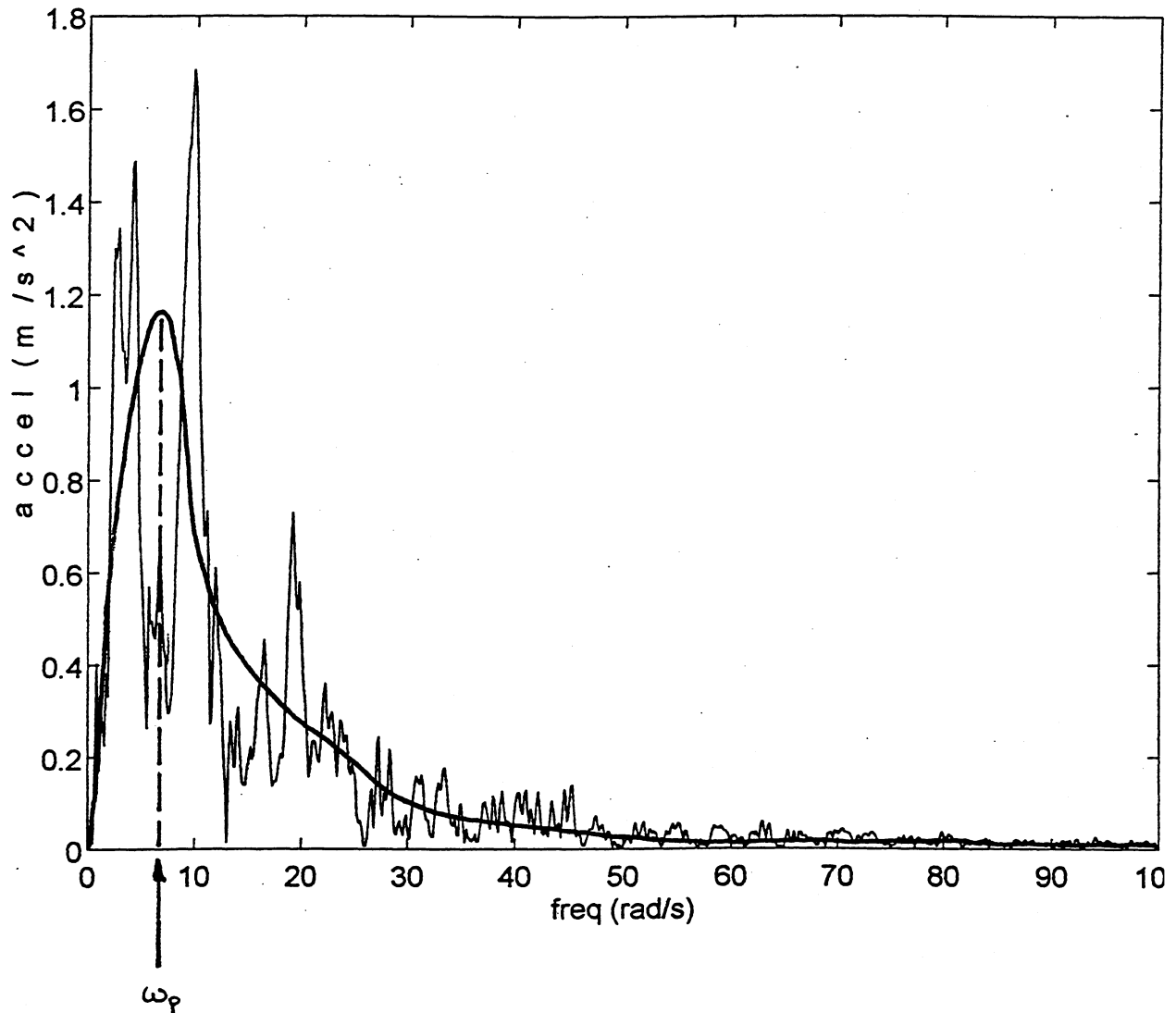


3.4 Determine the predominant period of the strong motion record.

By manual smoothing of FAS, $\omega_p \approx 6.6 \text{ rad/sec}$

Then

$$T_p = \frac{2\pi}{\omega_p} \approx 0.96 \text{ sec}$$



3.5 Compute the rms acceleration for the strong motion record.

RMS acceleration

$$a_{rms} = \sqrt{\frac{1}{T_d} \int_0^{T_d} [a(t)]^2 dt}$$

Evaluating integral numerically (trapezoidal rule) gives

$$a_{rms} = 0.73 \text{ m/sec}^2 = 0.074 g$$