TRIPARTITE

A Python Script for Ploting Velocity Spectra in Tripartite

Getting Started

These instructions will get you a copy of the project up and running on your local machine for development and testing purposes. See deployment for notes on how to deploy the project on a live system.

Prerequisites

- Matplotlib
- Numpy

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Give examples
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Installing

A step by step series of examples that tell you how to get a development env running

Say what the step will be

Theory of Tripartite

The time history of degree of freedom can be represented in Fourier domain as,

$$u = \sum_{i=0}^{N} U_i \exp(i\omega t)$$

The maximum value of displacement/rotation u can and velocity of $\dot{u}$ are related through equation,

$$\dot{u}_{max} = u_{max}\omega$$

Similarly, maximum value of accelaration $\ddot{u}_{max}$ and velocity are,

$$\ddot{u}_{max} = u_{max}\omega^2$$

In case of ground motions due to earthquake,

- u_{max} - Peak Ground Displacement, PGD
- $\dot{u}_{max}$ - Peak Ground Velocity, PGV
- $\ddot{u}_{max}$ - Peak Ground Accelaration, PGA

The spectral plot of velocity with frequency/period in logarithemic scale is Tripartite. The spectral displacement and accelration from velocity plot can be established using following equations.

$$\log_{10}(u_{max}) = \log_{10}(\dot{u}_{max}) - \log_{10}(\omega)$$
$$\log_{10}(\ddot{u}_{max}) = \log_{10}(\dot{u}_{max}) + \log_{10}(\omega)$$

The above equations indicates acceration axis will be inclinide -45 degree to y-axis and diplacement axis will be 45 degree to y-axis.

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