

SSS018-P06

Room: Convention Hall

Time: May 25 17:15-18:45

Complex Mode Analysis of Strong Motion Accelerograms

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We have a proprietary method of time series analysis, and we applied the method to the analysis of strong motion accelerograms. We report the results of the application.

Our method is a kind of mode analysis: we fit the given time series locally with a linear Green's function, and we calculate the poles of the function. We can obtain sufficient frequency information even from a fraction of a cycle data. For example, when we analyze a fraction of a cycle data with 20 samples, we can obtain 2500 times higher frequency resolution than Fourier analysis.

We analyzed some accelerograms of the earth quake which is known as "Iwate-engan-hokubu earthquake". We find that the main frequencies of the surface acceleration signal of P-wave and S-wave are both 5 Hz. The decay rate of P-wave is about 5 s^{-1} (the rate is comparable to its frequency), and that of S-wave is almost 0 s^{-1} . This means that P-wave is made up with repetitive impulsive waves and S-wave is almost sinusoidal.

Keywords: method of time series analysis, complex mode analysis, strong motion accelerograms