

A Novel Calculation for Estimating Earthquake of Magnitude > 7

*Cheng-Yin Wu¹

1. Taipei Municipal Yongchun Senior High School

The earthquake has always been the major issue of the cities near the earthquake zone. The unpredictability of earthquake has raised the attention on developing earthquake early warning systems (EWS).

This study uses earthquake waveform data from IRIS (Incorporated Research Institutions for Seismology). By using the seismic analysis code (SAC) to process and to analyze the seismic waveform data. This study reveals that the frequency component of the first arrived complete P wave can be used to estimate the magnitude of an earthquake. A low-pass filter with cutoff frequency 3Hz is used to preprocess the waveform signal. We use Fast Fourier Transform to turn time domain data into frequency domain data. The spectrum is then obtained and can be used to identify the characteristic of the frequency component of the first arrived complete P wave. An empirical linear relation is found, and this linear relation can be used to estimate the magnitude of earthquakes.

Our result shows the magnitude of an earthquake, therefore, possible to be estimated at the very beginning of an earthquake event. This method is beneficial for minimizing the damage in order to prevent unnecessary loss.

Keywords: P wave, Fourier Transform, Linear Regression