

Probabilistic Analysis of the Economic Impact of Earthquake Prediction Systems

Ruyue Yuan

Departmental Affiliation: Mathematics and Computer Science
College of Arts and Sciences

This research initiates from the question of whether or not earthquake prediction systems are actually worth investing in, as the cost of operating such systems is quite large compared to the number of lives which may be saved and, furthermore, false predictions may cause large-scale public panics and substantial economic losses. Some argue that it is more effective to invest in the research and development of infrastructure which can withstand earthquakes, rather than trying to predict earthquakes before they happen. Improving upon previous research on earthquake prediction systems, we use probabilistic methods to model the expected cost per life saved from a prediction system. The result is applied numerically to the San Francisco Bay area and the expected cost per life saved from the earthquake prediction system is found to be \$2.5 million in the case of a magnitude 8+ earthquake. While the amount is quite high, it is substantially lower than the corresponding expected cost per life saved of \$6.3 million from expenditures in earthquake engineering to improve building codes.

Information about the Author:

Ruyue Yuan is a junior mathematics major and a member of Christ College. She is involved in many academic research projects and is planning on pursuing further education in math. This project on earthquake prediction systems is a topic that involves both theoretical math problem-solving methods and realistic applications, which she has found most appealing in her research experience.

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Student Contact: ruyue.yuan@valpo.edu