

**Department of Structural Engineering
University of California, San Diego
SE 290 Seminar**



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“Analyze Uncertainties Associated with GMPE for PSHA”

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1:00 pm - 1:50 pm, Cognitive Science Building, Room 001

<https://structures.ucsd.edu/seminars>

Abstract

In probabilistic seismic hazard analysis (PSHA), the standard practice is to select a set of appropriate ground motion prediction equations (GMPEs) and assign weights on the logic tree, especially for regions where strong motion data are sparse and where no indigenous GMPE exists. Subjectively assigning weights to a set of models usually has the disadvantage of not obtaining mutually exclusive and collectively exhaustive models because of sparse or unavailable data. Therefore, the development of logic tree weightings in PSHA remains a major challenge. In this study, a distance metric measure for GMPEs is first analyzed to show how a set of GMPE's prediction models can be partially reconciled by using high-dimensional information visualization techniques. Visualization of a large suite of GMPEs onto a 2-D graphical map (Sammon's map) provides a powerful theoretical framework that can guide the selection of a set of representative models. These models are considered mutually exclusive and collectively exhaustive, and can have the ability to represent the center, body, and range of ground-motion distribution in a logic tree analysis. Second, determination a set of weights for PSHA are estimated based on the residuals, likelihood and EDR-index. The methods presented here, that improve consistency in the weight assignment, can help to reduce overall epistemic uncertainties and offer a way of assigning weight on the logic tree.

Biography

Prof. Chin-Hsiung Loh is currently a visiting professor at the University of California, San Diego, and a professor emeritus of National Taiwan University. He received his Ph.D. degree from National Taiwan University (1980). He has been a professor of civil engineering at National Taiwan University. During the past he served as the Director of Center for Research on Earthquake Engineering, College of Engineering, National Taiwan University, Taiwan (1990~1993), the Director of National Center of Research on Earthquake Engineering (1997~2003), Director of National Science & Technology Center for Disaster Mitigation (2003~2004). Professor Loh's research is in Structural Health Monitoring and Probabilistic Seismic Hazard Analysis. He received outstanding research award from National Science Council (1987~1989, 1991~1993, 1993~1995, 1995~1997) and a special program research award form National Science Council (1997~2000). Starting 2007 he became a distinguished professor of National Taiwan University. In the year of 2009, he received the achievement award from The Taiwan Society of Earthquake Engineering. He is a fellow member of both Chinese Taiwan Society of Earthquake Engineering and Chinese Society of Structural Engineering.