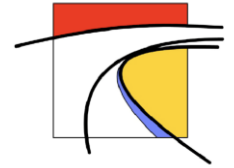


Universidad Técnica Federico Santa María

Departamento de Obras Civiles



Invitación a Charla

Título **Dynamic modelling, response and global reliability of offshore wind turbines**

Resumen The renewable energy harvesting, especially wind energy, was developed very quickly in the past decades in the world, and in particular in China. In recent years, the offshore wind energy harvesting has been attached increasing importance. The global reliability of offshore wind turbines is crucial to the tradeoffs between the safety and economics of energy harvesting. For this purpose, the following issues were extensively studied in the past decade, and will be outlined in the presentation: (1) A new approach for the reliability of complex nonlinear systems, the probability density evolution method, was extensively studied and developed in the past decade. By this method, a generalized density evolution equation was derived and solved to yield the probability density functions of quantity of interest, and then the reliability can be obtained by imposing an absorbing boundary condition; (2) An integrated model of wind turbines involving the coupling of the blades, nacelle, hub, tower, pile and soil, and the aerodynamic effects and pitch control, was established; and (3) The fluctuating wind field modeling by introducing the wavenumber-frequency joint spectrum, which circumvents the problem of decomposition of cross-spectral matrix and spatial interpolation, was developed. In particular, a closed-form of the rotational sampling field for blades was derived for the first time. On such bases, the global reliability evaluation of offshore wind turbine systems is implemented. The problems to be further studied will also be discussed.

Expositor Jianbing Chen, Professor, School of Civil Engineering & State Key Laboratory of Disaster Reduction in Civil Engineering, Tongji University, China.

Sobre el Expositor Jianbing Chen is currently a full professor on the faculty at Tongji University in the School of Civil Engineering & State Key Laboratory of Disaster Reduction in Civil Engineering. Dr. Chen received a Ph.D. in Civil Engineering from Tongji University, China in 2002. He has been a visiting scholar/visiting professor in the University of Southern California in USA (2006-2007), Aalborg University in Denmark (2012), and Vienne University of Technology in Austria (2014).



He specializes in the area of earthquake engineering, stochastic dynamics and structural reliability. Specifically, he is working on the development of probability density evolution method (PDEM) for performance evaluation and reliability assessment of structures/engineering systems involving randomness both in the system properties and excitations. Dr. Chen is the co-author of an English book titled "Stochastic Dynamics of Structures" (John Wiley & Sons, 2009), the co-author of 3 Chinese books and over 120 peer-reviewed journal papers, in the fields of structural stochastic analysis and reliability theory. He was selected into the "NCET Plan" of Ministry of Education of China in 2007, received the Huo Ying Dong prize in 2012, "National Outstanding Scientific and Technological Workers" of China in 2014, the second-class National Natural Science Award of China in 2016 (2nd achiever), the Early Achievement Award of the International Association for Structural Safety and Reliability in 2017, and was granted by the National Science Fund for Distinguished Young Scholars in China.

He now also serves as a member of the Board of Directors of the International Civil Engineering Risk and Reliability (CERRA), member of the Joint Committee on Structural Safety (JCSS), Chairman of the Random Vibration Committee of the Chinese Society of Vibration Engineering (CSVE), Chairman of the Vibration Mechanics Committee of the Shanghai Society of Theoretical and Applied Mechanics (CSTAM), and Associate Editor of the journal Structure and Infrastructure Engineering.

Fecha y Lugar

Miércoles 10 de julio de 2019, 10:30 hr, Sala C-300, Casa Central