

## Structural dynamic response of the coupling between transmission lines and tower under random excitation

**Yanne Soares Fernandes, Marcela Machado, Maciej Dutkiewicz**

*Abstract:* This work aims to present a model of an overhead power transmission line with the Spectral Element Method (SEM) to overcome the current limits of dynamic analysis in medium and high frequencies and verify the dynamic behaviour under random excitation. The numerical study performed through the computational implementation of the tower-cable coupled structure using SEM and the Finite Element Method (FEM) and investigated their dynamic response. Because SEM is an exact solution method, there is no need for discrete continuous elements which implies in low time processing. The vibration responses obtained by SEM and FEM are presented and compared. Transmission line system is usually exposed to several different uncertainty source vibration, which will affect its dynamic behaviour. Thus, this paper treats the problem of the vibrational response of the coupling structures modelled by the spectral element method under random excitation.

---

<sup>1)</sup> Yanne Soares Fernandes, B.A. (M.Sc. student): University of Brasilia, 70910-900, Brazil (BR), yannemarcela@hotmail.com.

<sup>2)</sup> Marcela Machado, Ph.D.: University of Brasilia, 70910-900, Brazil (BR), mromarcela@gmail.com.

<sup>3)</sup> Maciej Dutkiewicz, Associate Professor: University of Science and Technology in Bydgoszcz, macdut@utp.edu.pl, Poland (PL), macdut@utp.edu.pl.