



基于功率谱矩阵开方分解的空间相关多点地震动合成方法

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SIMULATION OF SPATIAL CORRELATIVE GROUND MOTIONS BASED ON THE SQUARE ROOT OPERATION OF POWER SPECTRUM MATRIX

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摘要 基于前人对多点地震动合成方法的研究,提出了一种多点地震动的合成方法。该方法基于复功率谱矩阵的开方分解,将复功率谱矩阵分解为一个Hermite 矩阵与其共轭转置矩阵的乘积,并给出了基于此分解的考虑空间相关性并满足功率谱矩阵的幅值谱和相位谱的求解公式。此外,在合成功率谱矩阵时还考虑了空间各点地震动自功率谱强度的变化,以使得合成的多点地震动更好地适用于大跨度结构物的多点输入分析。

关键词: [地震动合成](#) [多点地震输入](#) [空间相关](#) [功率谱矩阵](#) [开方分解](#)

Abstract: Based on previous studies, a simulation method for multi-point ground motion time histories is developed. Employing the square root operation of complex power spectral density matrix, the paper defined the complex power spectral density matrix as the product of Hermite matrix and its conjugate transposed matrix. Meanwhile, the relationship between amplitudes, phase angels of simulated ground motions and the element of the Hermite matrix was given. In addition, the variation of the amplitude of white-noise bedrock acceleration was taken in account, which makes this method more suitable for the simulation of the multi-point ground motions of long-span structures.

Key words: [ground motion simulation](#) [multi-point input](#) [spatial relative](#) [power spectral density matrix](#) [square root operation](#)

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