Dynamic analysis of two-dimensional periodic structures based on precise integration method

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Abstract: An accurate and efficient method is presented for analyzing the dynamic response of two-dimensional periodic structures. The algebraic structure of the corresponding matrix exponential is analyzed and, based on its special structure, an accurate and efficient method for its computation is proposed. Accuracy is maintained by utilizing the precise integration method, while great efficiency is achieved in the computational effort by using the periodic property of the structure and the energy propagation feature of the dynamic system. The proposed method is compared to the conventional Newmark and R-K methods and shown to be accurate, efficient and extremely frugal in its memory requirements.

Periodic structures; Matrix exponential; Precise integration method; Dynamic responses.