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近场波动模拟的一种应力人工边界

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摘要 采用平面波和远场散射波混合透射，引入无限介质线弹性本构关系建立了一种应力人工边界条件. 其优点在于边界结点反应与内部有限元结点反应采用相同的积分格式计算，有限元积分方法稳定时不存在人工边界失稳问题. 数值算例表明：边界精度高于现有黏性边界、黏弹性人工边界，以及一、二阶透射人工边界.

关键词 近场波动,局部人工边界,稳定性,精度,应力人工边界

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A stress artificial boundary in FEA for near-field wave problem

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Abstract

The stability and accuracy of local artificial boundary are two important criterions for evaluating its applied value in engineering. In this paper, a stress artificial boundary condition was developed by mixing the planar waves and the scattered waves transmitting into the linear elastic infinite media through artificial boundary. For the proposed boundary condition, the responses of boundary nodes and finite element nodes are calculated by the same integral method, and its stability condition is also the same as the finite element integral method. Numerical examples demonstrate that the accuracy of the proposed boundary is higher than that of existing viscous boundaries, viscous-spring boundaries, the first-order transmitting boundary and the second-order transmitting boundary.

Key words near-field wave local artificial boundary stability accuracy stress artificial boundary

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