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基于高性能GPU计算的城市建筑群震害模拟(PDF)

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Title: Seismic damage simulation of urban buildings based on high performance GPU computing

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摘要: 为适应不断提高的震害预测需求,精细化模型已经成为城市区域震害预测的主要发展方向。然而传统的基于CPU平台的计算方法成本过高,使得精细化模型的应用受限。近年来,GPU技术由于其强大的并行计算能力和较为低廉的价格优势,在通用计算领域得到了快速的发展和应用。基于GPU-CPU协同计算技术,建立了城市区域震害的计算模拟方法,显著缩短了城市区域震害预测的时间。并采用该方法对某中型城市的真实震害进行了模拟应用,展示了GPU技术在大区域城市建筑群震害模拟中的独特优势。

Abstract: To meet the continuously increased needs for seismic damage prediction, refined models have become an important development trend in urban regional seismic damage prediction. However, the application of refined models is limited by the high cost of computation if it is implemented on traditional CPU platform. In recent years, a technology with powerful parallel computing capability and lower cost, GPU technology, has been developed and applied rapidly. In this paper, a simulating method for urban regional seismic damage that can significantly reduce the computation time, was developed based on GPU-CPU cooperative computing technology. The proposed method was then applied to the seismic damage simulation of a medium-sized city to illustrate the unique advantages of GPU technology in large-scale regional seismic damage simulation.

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