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基于概率接触算法的椭球离散元及料仓试验研究

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PROBABILITY-BASED CONTACT ALGORITHM FOR ELLIPSOIDAL PARTICLES IN DEM AND SILO TESTS

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摘要

该文提出一种基于概率接触算法, 并嵌入到球形颗粒离散元程序中, 在保持原有颗粒接触检索效率的基础上, 实现了非球形颗粒模拟。以椭球颗粒为例给出了算法推导过程, 进行了球形西米、椭球形绿豆和长米的料仓卸料过程模拟, 对颗粒体系的流态和流量进行了研究, 并开展了相应的试验加以验证。结果表明: 基于概率接触算法的非球形颗粒离散元法适用于在椭球颗粒流动特性方面的研究, 可以较精确的模拟卸料过程, 且计算效率较高。

关键词: [基于概率接触算法](#) [椭球颗粒](#) [料仓试验](#) [离散元法](#) [流动特性](#)

Abstract:

A probability-based contact algorithm is proposed. It is implemented in a sphere-based DEM code for modelling non-spherical particles with the same computational efficiency of contact detection as that for spherical particles. An ellipsoid is considered as an example for the probability-based contact algorithm derivation. Processes of silo discharge of spherical sago, ellipsoidal mungbean and rice are simulated respectively. Corresponding silo tests are also carried out. The flow pattern and flow rate of a particle system with different particle shapes are compared between the results obtained from the simulation and experiment. It can be found that the probability-based contact algorithm is suitable for the study of flow characteristics of ellipsoidal particles, with sufficient accuracy and high efficiency.

Key words: [probability-based contact algorithm](#) [ellipsoidal particles](#) [silo tests](#) [DEM](#) [flow characteristics](#)

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