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A nonsmooth program for jamming hard spheres.

We study packings of n hard spheres of equal radius in the d -dimensional unit cube. We present a nonsmooth function whose local extrema are the radii of jammed packings (where no subset of spheres can be moved keeping all others fixed) and show that for a fixed number of spheres there are only finitely many radii of such jammed configurations. We propose an algorithm for the maximization of this maximal radius function and present examples for 5 - 8 disks in the unit square and 4 - 6 spheres in the unit cube. The method allows straightforward generalization to packings of spheres in other compact containers. The origin of this research is a problem in pharmaceutical science on predicting the release kinetics of matrix tablets. This work has been partially supported by the US National Science Foundation through grant DMS 1016214. (Received December 29, 2017)