Title : Filling boxes in a Box

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ABSTRACT

The Three-Dimensional Packing Problem refers to the arrangement of objects in such a way that they completely fill the interior space of a larger container without overlapping to achieve maximal space utilization. However, analyzing and enumerating all possible packing configurations in three-dimensional cases remains highly complex and requires rigorous mathematical principles for proper formulation and explanation. This research aims to investigate the mathematical foundations underlying arrangement and packing in three-dimensional space. In particular, the study analyzes and determines the number of possible ways to pack 1×1×1 and 1×1×n boxes into an n×n×n container so that the space is completely filled under the specified constraints. All feasible configurations are examined under the condition that no overlapping of objects is allowed. The results provide insight into the combinatorial structure of the problem and present a systematic approach to count packing arrangements. Furthermore, the results may be applied to storage optimization and spatial efficiency problems in broader contexts.

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