

Partitioning the projective plane and the dunce hat

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The faces of a simplicial complex induce a partial order by inclusion in a natural way. We say that the complex is partitionable if its poset can be partitioned into boolean intervals, with a maximal face at the top of each.

In this work we show that all the triangulations of the real projective plane, the dunce hat, and the open Möbius strip are partitionable. To prove that, we introduce simple yet useful gluing tools that allow us to abridge the discussion about partitionability of a given complex in terms of smaller constituent relative subcomplexes. The gluing process generates partitioning schemes with a distinctive shelling-like flavor.