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Colourful Simplicial Depth, Grids and Algorithms

We describe some combinatorial and geometric problems relating to colourful simplicial depth. The first is on covering (perhaps modulo 2) a box of grid points with axis-aligned affine subspaces. The objective is to do this so that each co-ordinate hyperplane containing grid points contains a subspace from the cover, and to minimize the number of elements in the cover. Others include computing the colourful simplicial depth of a configuration quickly, and solving a colourful version of linear programming feasibility.