## **Computing Random Matchings in Permutohedra**

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The permutohedron of order n is the convex hull of all permutations of the vector  $(x_1, x_2, \ldots, x_n)$ in  $\mathbb{R}^n$ . It is an (n-1)-dimensional polytope. The vertices and edges of the permutohedron of order n is isomorphic to the Cayley graph of the symmetric group generated by the transpositions of two consecutive elements, i. e.  $G_n = Cay(S_n, T_n)$  where  $S_n$  is the symmetric group and  $T_n = \{(i, i+1) | 1 \leq i \leq n-1\}$  is the set of adjacent transpositions. The problem of computing random matchings in permutohedra is intractable due to the size of graph  $G_n$ . We show that random matchings in permutohedra can be computed for small n.