

Acyclic orientations of graphs

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Acyclic orientations of graphs have a number of applications, including a heuristic for graph colouring. We will discuss why we are interested in them and some investigations. Stanley showed that the number of acyclic orientations of a graph is, apart from sign, the evaluation of the chromatic polynomial at -1 . There is a recurrence for the average number of acyclic orientations of a graph with a given number of vertices and edges; we would like to have further information on this distribution (for example, the variance). Given two acyclic orientations, it is possible to move from one to the other by reversing only the edges whose orientations differ, preserving acyclicity at each step. This gives rise to various Markov chains for choosing at random. The rate of convergence of these is an open problem.