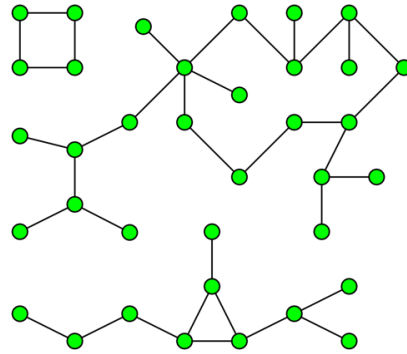


Math B295: Topics in Mathematics—Graph Theory



A “graph” is a set of “vertices” (dots) connected (or not) by “edges” (lines or arcs). What can be said about such an object? For example, if we allow at most one edge to join each pair of vertices, then what is the maximum number of edges in a graph with N vertices? What is the minimum number of edges necessary for a graph with N vertices to stay “connected” (in one piece)? How many “nonisomorphic” (essentially different) graphs have N vertices? What else might we like to know? In Math 295 we ask questions, look for patterns, make conjectures, and try to prove (or find counterexamples for) our observations. We explore the pure mathematical terrain that is graph theory, and pause for a few practical applications along the way. Topics may include: subgraphs, isomorphic graphs, degrees of vertices, trees, vertex coloring, edge coloring, Hamilton cycles, Eulerian circuits, spanning trees, matchings, scheduling, and planar graphs.