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Daniela Genova* (d.genova@unf.edu), University of North Florida, Department of Mathematics and Statistics, Jacksonville, FL 32224. *Forbidding and Enforcing Systems on Graphs*.

A forbidding and enforcing system (fe-system) on graphs is a tool that defines classes of graphs based on two sets of constraints imposed on the subgraphs. A forbidding set disallows certain combinations of subgraphs in a graph, while allowing parts of these combinations to be present. An enforcing set of constraints ensures that if certain subgraphs appear in a graph, they are embedded in some larger subgraphs from a pre-specified set. Together, a forbidding set and an enforcing set form an fe-system which defines a class of graphs, such that each graph in the class conforms to both sets of constraints. This talk will present characterizations of familiar classes of graphs such as cycles, bipartite, regular, and Eulerian by fe-systems and discuss solutions to combinatorial problems, e.g. the k-colorability problem defined by fe-systems. Since fe-systems can define structures through the local character of their substructures, regardless of whether the substructures are periodic or aperiodic, they exhibit a potential to model a wide variety of biomolecular, crystal, and quasi-crystalline structures. (Received January 18, 2012)