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Amrita Acharyya, Jon M Corson and Bikash C Das* (bikash.das@ung.edu). *Cofinite Graphs and Groupoids and their Profinite Completions.*

We define cofinite graphs and cofinite groupoids in a unified way that extends the notion of cofinite groups introduced by B. Hartley. The common underlying structure of all these objects is that they are directed graphs endowed with a certain type of uniform structure, that we call a cofinite uniformity. We begin by exploring the fundamental theory of cofinite directed graphs in full generality. The general theory turns out to be almost completely analogous to that of cofinite groups. For instance, every cofinite directed graph has a unique completion which is a compact cofinite directed graph. Moreover, compact cofinite directed graphs are precisely the profinite directed graphs, i.e., projective limits of finite discrete topological directed graphs. We then apply the general theory to directed graphs with additional structure such as graphs (in the sense of Serre) and groupoids, thus leading to the notions of cofinite graphs and cofinite groupoids. Cofinite groupoids with only finitely many identities behave much the same as cofinite groups, which are the same thing as cofinite groupoids with a single identity. However the situation for cofinite groupoids with infinitely many identities is more complicated. (Received August 06, 2015)