

1163-13-169

Nicholas R. Baeth (nicholas.baeth@fandm.edu) and **Daniel Smertnig***
(daniel.smertnig@uni-graz.at). *Monoids of graph agglomerations.*

Let G be a finite graph (possibly with multiple edges but no loops). An *agglomeration* on G is a function f assigning a nonnegative integer to every vertex and every edge, in such a way that $f(e) \leq f(v)$ whenever an edge e is incident with a vertex v . Under pointwise addition, the agglomerations on G form a reduced, finitely generated, Krull monoid. These monoids of graph agglomerations appear as codomains of transfer homomorphisms for monoids of modules over Bass rings. Hence direct-sum decompositions for finitely generated, torsion-free modules over Bass rings may be studied through the arithmetic of monoids of graph agglomerations. In this talk, we discuss several results on the factorization theory of monoids of graph agglomerations. In particular, we demonstrate that their factorization theory is tied to the structure of the underlying graph in a natural way, and that several arithmetical invariants may be expressed, or at least estimated, in terms of graph-theoretical invariants. A characterization of half-factorial monoids of graph agglomerations immediately yields a corresponding characterization of Bass rings over which direct-sum decompositions of finitely generated torsion-free modules have a unique factorization length. (Received August 25, 2020)