Hereditary Atomicity and ACCP in Monoids and Integral Domains

Vulakh, Joseph (School: Paul Laurence Dunbar High School)

The relationship between atomicity and ACCP, two properties measuring the way elements factor in integral domains, is central to abstract factorization theory. It is known that all integral domains satisfying ACCP are atomic and that the converse does not hold, but this connection is not fully understood, and few examples of atomic integral domains not satisfying ACCP have been found. Two related properties, hereditary atomicity and hereditary ACCP, were recently introduced with the aim of better understanding this complex relationship, and it is conjectured that they are equivalent. In this project, hereditary atomicity and hereditary ACCP were investigated further for specific classes of integral domains and in the more general context of monoids. The conjecture that hereditary atomicity and hereditary ACCP are equivalent was proved for torsion-free monoids and certain types of integral domains with polynomial-like structure. These results establish the validity of the conjecture for several important classes of monoids and integral domains and provide methods for approaching the general case.

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