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Non-classical Linear Divisibility Sequences and Cyclotomic Polynomials,
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Abstract

Divisibility sequences are defined by the property that their elements divide each other whenever their indices do. The divisibility sequences that also satisfy a linear recurrence, like the Fibonacci numbers, are generated by polynomials that divide their compositions with every positive integer power. We completely characterize such polynomials in terms of their factorizations into cyclotomic polynomials using labeled Hasse diagrams, and construct new integer divisibility sequences based on them. We also show that, unlike the Fibonacci numbers, these non-classical sequences do not have the property of strong divisibility.