

Orderings of k-Markov numbers

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The k-Markov numbers, introduced by Gyoda and Matsushita, are positive integers which appear in solutions to the equation $x^2 + y^2 + z^2 + k(xy + xz + yz) = (3+3k)xyz$. When k is 0, this recovers the famous Markov equation, a topic of frequent study for more than a century. An impetus for the study of Markov numbers is Frobenius' unicity conjecture. One approach to proving the unicity conjecture is demonstrating that the Markov numbers provide a total ordering on rational numbers in the interval $[0,1]$. With this perspective, Lee-Li-Rabideau-Schiffler and Huang made progress towards the unicity conjecture using techniques from the theory of cluster algebras. By working with generalized cluster algebras, in this talk we consider the orderings on rational numbers induced by k-Markov numbers as k varies. We see some similarities and surprising differences. This is based on arXiv:2512.04026 and ongoing joint work with Min Huang.