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Spectrally Arbitrary Matrix Patterns that Depend on Field Structure

An nxn pattern P of zeros and stars (nonzeros) is said to be spectrally arbitrary over a field F provided any n-th degree monic polynomial in F[x] can be realized as the characteristic polynomial of a matrix formed from replacing the stars in P by nonzero elements from F. A pattern may be spectrally arbitrary over some fields, but not others. In this talk we will look at some specific patterns for which the algebraic properties of a given field play a critical role in whether or not the pattern is spectrally arbitrary for that field.