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A Complete Unitary Similarity Invariant for Unicellular Matrices

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A fundamental problem in matrix analysis is the *unitary similarity problem*: Under what necessary and sufficient conditions are two $n \times n$ complex matrices unitarily similar? We prove in [1] that the unitary similarity class of any upper triangular unicellular Toeplitz matrix R is determined by the values of $\|f(R)\|$ for various $f \in \mathbb{C}[t]$. We augment the criterion slightly to obtain necessary and sufficient conditions that classify unicellular matrices up to unitary similarity.

- [1] D. Farenick, T. G. Gerasimova, N. Shvai, *Linear Algebra Appl.* **435**, (2011), pp. 1356–1369.