

Matrices are everywhere, but they can also be cumbersome to work with. A standard strategy therefore is to replace complicated matrices with simpler matrices while preserving all the desired properties of the original.

This talk explores the basic ground rules for such a simplification, and presents some families of answers. These can vary widely from simple generalizations of row-reduced echelon form to rich combinatorial structures. In some key cases we even find that there is provably no solution.

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