

# Matrix pencils completions, combinatorics, and integer partitions

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## Abstract

The general Matrix Pencil Completion Problem (MPCP), apart of purely theoretical importance, has important motivations and applications in control theory of linear systems, including pole placement, non-regular feedback, dynamic feedback, zero placement and early-stage design. Due to the complexity of the problem, although studied by many authors, it still remains open. In the recent years new combinatorial methods have appeared that involve novel objects and tools related to combinatorial properties and comparisons of partitions of integers. We shall present some of the most important results involving combinatorial results on partitions of integers, and some mile-stones towards a solution of MPCP.

## Keywords

Matrix pencils, Completion, Partitions.