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## Inverse Eigenvalue Problems and Multiple Orthogonal Polynomials

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Multiple orthogonal polynomials (MOP's) arise in various applications, including approximation theory, random matrix theory, and numerical integration. To define MOP's, one needs multiple inner products, leading to two types of MOP's, which are mutually biorthogonal. These MOP's satisfy recurrence relations, which can be linked to linear algebra, via discretization. As a result we get an inverse eigenvalue problem to retrieve the matrix of recurrences directly. We provide two algorithms for solving the inverse eigenvalue problem, one based on classical equivalence transformations and one linked to (block) Krylov methods. Numerical illustrations are provided to demonstrate correctness of the approach and also reveal the strong sensitivity of the problem.

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