Perfect Shifted QR for Rank Structured Pencils

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It is known that executing a perfect shifted QR step via the implicit QR algorithm performs poor in terms of stability, and accuracy. Typically several steps are required before deflation actually takes place. This behavior can be remedied by determining the similarity transformation via the associated eigenvector. Similar techniques can be deduced for the QZ algorithm and the rational QZ algorithm. In this talk we generalize this even further and present an approach for executing a perfect shifted QR step for general rank structured pencils. We prove that the rank structures of the matrices involved in the pencil are preserved, and moreover we examine the preservation of spectral properties of subblocks in the pencil.

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