Generalized palindromic polynomials

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Abstract

Matrix polynomials of the form

$$P(\lambda) = A_0 + A_1\lambda + \ldots + f(A_1)\lambda^{m-1} + f(A_0)\lambda^m$$

are considered where $A_i \in \mathbb{C}^{n\times n}$, $\lambda \in \mathbb{C}$, and $f : \mathbb{C}^{n\times n} \to \mathbb{C}^{n\times n}$.

These polynomials contain the classical T-palindromic polynomials of MMMM for $f(A) = A^T$. Recently, Fassbender,MMS discussed so-called PCP-palindromic polynomials, which are related to the case $f(A) = TAT$, where T is a symmetric permutation matrix. In both cases the eigenvalues of $P(\lambda)$ are reciprocally paired.

In the talk it will be discussed what properties f should have in order for $P(\lambda)$ to have reciprocally paired spectrum. First computational approaches are also presented.