

Structures preserved by matrix inversion

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In this talk we investigate some matrix structures on $\mathbb{C}^{n \times n}$ that have a good behaviour under matrix inversion. The first kind of structure is strongly related to low displacement rank structure. The second kind of structure deals with certain low rank submatrices. In this case, it can be shown that also the inverse matrix has a low rank submatrix, which we can explicitly determine. This allows us to generalize a theorem due to Fiedler. The generalization consists in the fact that our rank structures may have their own shift matrix $\Lambda_k \in \mathbb{C}^{m \times m}$, for suitable m , with Fiedler's theorem corresponding to the limiting cases $\Lambda_k \rightarrow 0$ and $\Lambda_k \rightarrow \infty I$.