INVITATION TO THE LECTURE

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IS ANY CONVERGENCE BEHAVIOUR POSSIBLE FOR BLOCK GMRES ?

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Block Krylov subspace methods are iterative methods for solving systems of linear equations with multiple right-hand sides. At each step, all solutions to the system are sought in the space containing the contribution of each individual right-hand side, which significantly reduces the computational cost compared to solving the systems sequentially (one by one). We focus on block methods for non-Hermitian systems, in particular on block GMRES. While it is known that any non-increasing convergence curve is possible for standard GMRES with one right-hand side and a matrix with a given spectrum, no analogue of this result is currently available for block methods, when multiple systems are solved at once. In the talk, after summarizing classical results regarding standard GMRES, we show what convergence behaviour is admissible for block GMRES and how the matrices and right-hand sides producing such behaviour can be constructed.