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Radiation Transport Using Rayleigh Quotient Iteration with Multigrid in Energy Preconditioning

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Efficiently solving the eigenvalue form of the radiation transport equation is an important task in nuclear reactor analysis. Rayleigh quotient iteration (RQI) offers significantly better iterative performance relatively to standard solvers used in the industry, such as power iteration. The downside is that the shifted linear systems that must be solved within RQI are significantly more challenging than those encountered in power iteration. In this talk we discuss the difficulties in solving these shifted linear systems and discuss the use of GMRES in conjunction with a multigrid in energy preconditioner.