# Model order reduction for parametric generalised EVPs

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We investigate the resolution of parametric generalized eigenvalue problems in the form $A(\sigma)x(\sigma) = \lambda(\sigma)Mx(\sigma)$ for given $\sigma \in S$ with $(\lambda(\sigma), x(\sigma)) \in (0, \Lambda) \times \mathbb{R}^n$, $A(S) \subset \mathbb{S}^{n\times n}_{++}$ and $M \in \mathbb{S}^{n\times n}_{++}$. We look for a rapid solution to this GEVP using the Ritz method. We first find a basis for the Ritz subspace $V \subset \mathbb{R}^n$ and solve the GEVP in this subspace. We built $V$ using an average matrix $\overline{A}$ related to $(0, \rho\Lambda)$ with the help of a correction formula. For this, we use a bivariate sparse collocation operator of the correction function to built the Lagrange interpolants of the correction. We finally use the average eigenbasis to solve the GEVP to estimate the approximation error and prove the convergence rate.

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