Theory

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Algorithm 1 Greedy algorithm for reduced basis

Input: $\{\lambda_i\,, h_{\lambda_i}\}_{i=1}^{N}$, ϵ

Initialize $i = 0$
rb $= \{\}$, gp $= \{\}$
$\sigma_0 = 1$
Seed choice (arbitrary): $\Lambda_1 \in \mathcal{T}$
while $\sigma_i > \epsilon$ **do**
    $i = i + 1$
    gp $=$ gp $\cup\{\Lambda_i\}$
    $e_i = \mathrm{GS}(h_{\Lambda_n}, \mathrm{rb})$ (Gram-Schmidt orthonormalization) [AV: If rb={} then $\mathsf{GS}(h, \mathsf{rb}) = h/||h||$]
    rb $=$ rb $\cup\{e_i\}$
    $\Lambda_{i+1} = \mathrm{argmax}_{\lambda\in\mathcal{T}}\sigma_i(\lambda)$ [AV: $\sigma_i(\lambda) := \|h_\lambda - \mathcal{P}_i h_\lambda\|^2$]
    $\sigma_i = \sigma_i(\Lambda_{i+1})$
end while

Output: rb $= \{e_i\}_{i=1}^{n}$ and gp $= \{\Lambda_i\}_{i=1}^{n}$