Patch-wise Integration of Trimmed Surfaces

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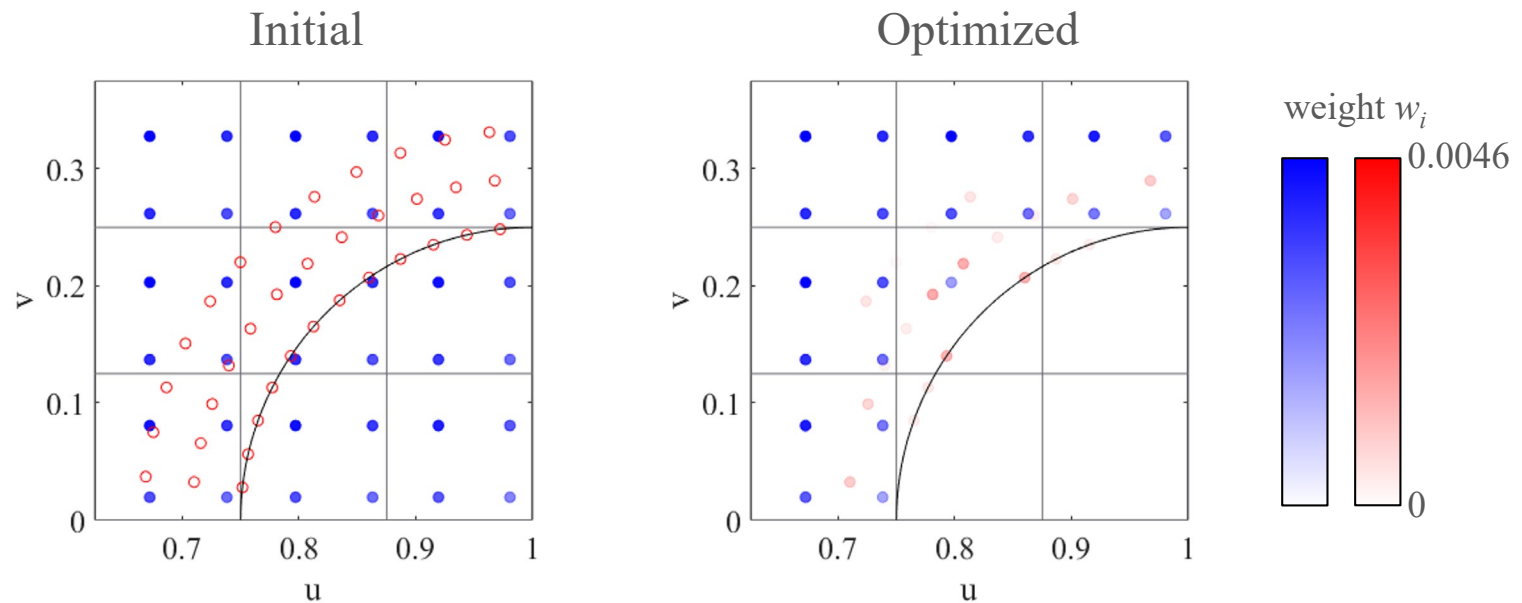# Method

- Nonlinear moment-fitting equations

$$\int_\Omega \begin{pmatrix} f_1 \\ f_2 \\ \vdots \\ f_m \end{pmatrix} d\boldsymbol{\xi} = \begin{bmatrix} f_1(\boldsymbol{\xi}_1) & f_1(\boldsymbol{\xi}_2) & \cdots & f_1(\boldsymbol{\xi}_n) \\ f_2\boldsymbol{\xi}_1) & & \ddots & \\ \vdots & & & \\ f_m(\boldsymbol{\xi}_1) & \cdots & & f_m(\boldsymbol{\xi}_n) \end{bmatrix} \begin{pmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{pmatrix}$$

- 1st decision: Positions of the integration points ξ_i from the patch-wise integration rule for the untrimmed patch

- 2nd decision: Integration weights w_i as design variables
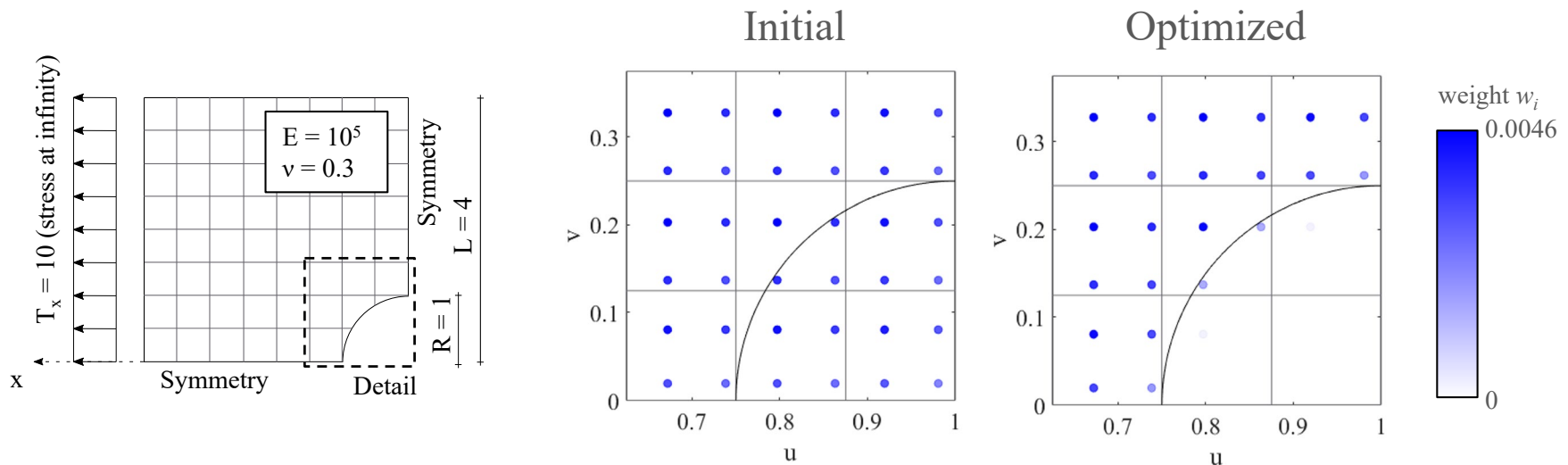
Additional integration points

- Unsatisfactory results because of a shortage of points in the trimmed elements

- Extra integration points in a band along the trimming curves (symbol: ○)

Convergence study

- Example: Infinite plate with circular hole

- Improved convergence due to additional integration points
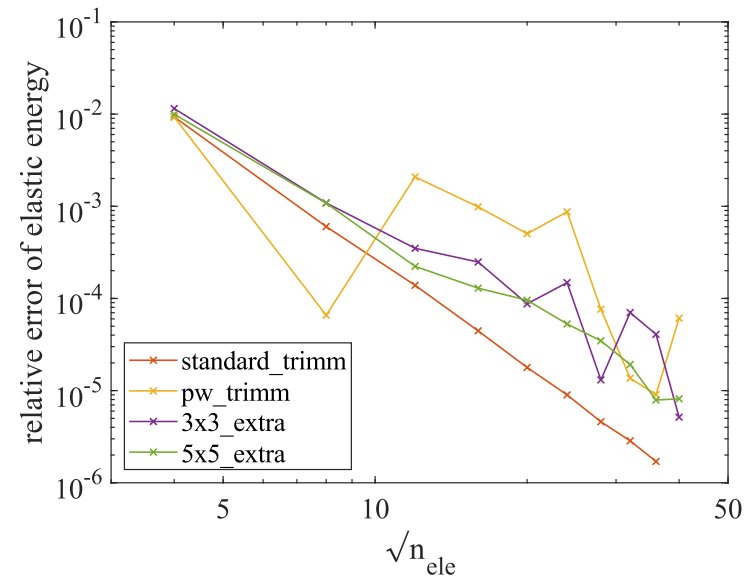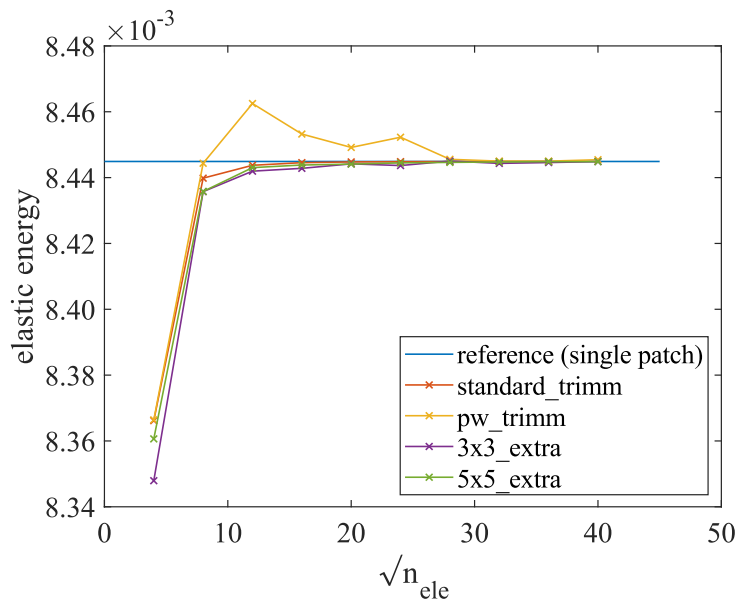
- Prospect: Positions and number of additional points as key for an amended method

Thank you for your attention!