

Oscillatory behaviour of the RBF-FD approximation accuracy under increasing stencil size

Author: Andrej Kolar-Požun

Mentor: Gregor Kosec

Comentor: Matjaž Depolli

"Jožef Stefan" Institute
University of Ljubljana - Faculty of Mathematics and Physics

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Problem setup

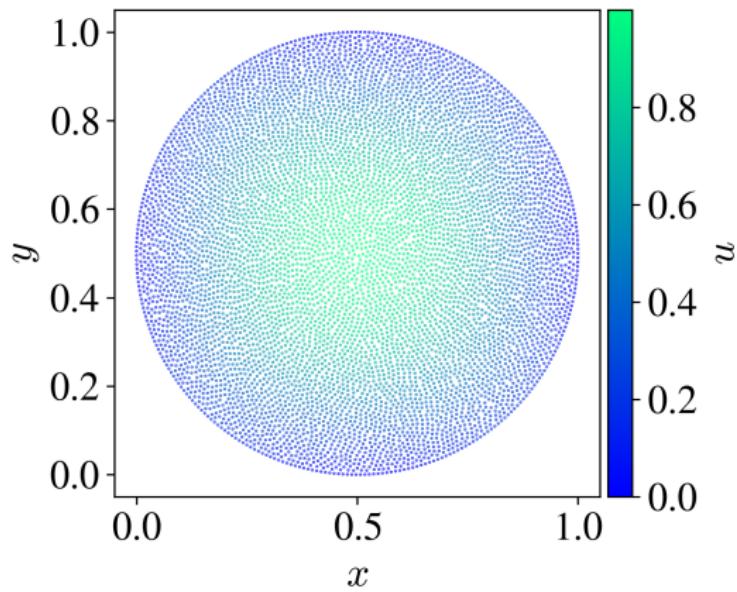
- Solving $\nabla^2 u(x, y) = f(x, y)$ on a disc.

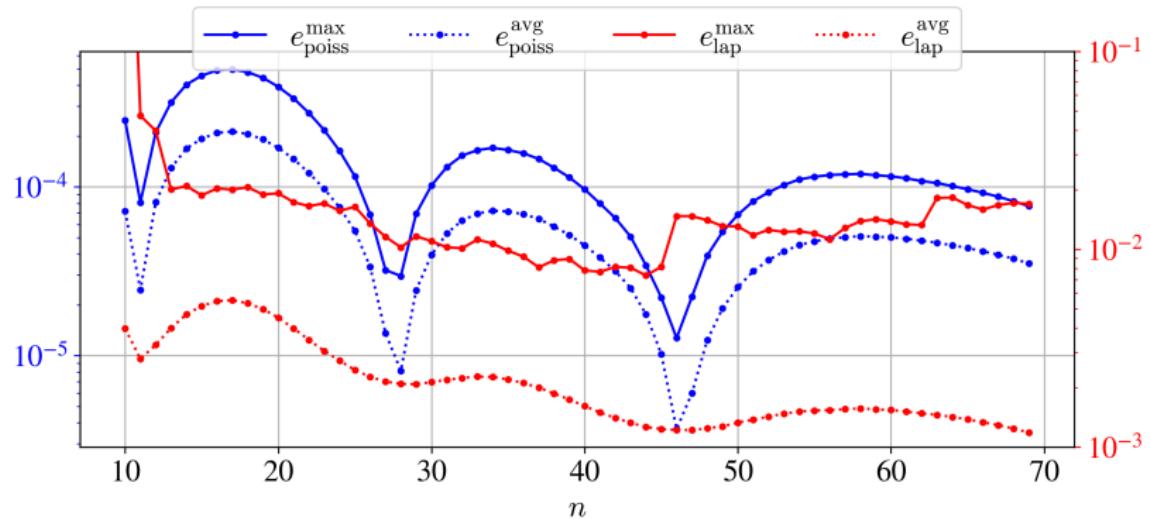
Problem setup

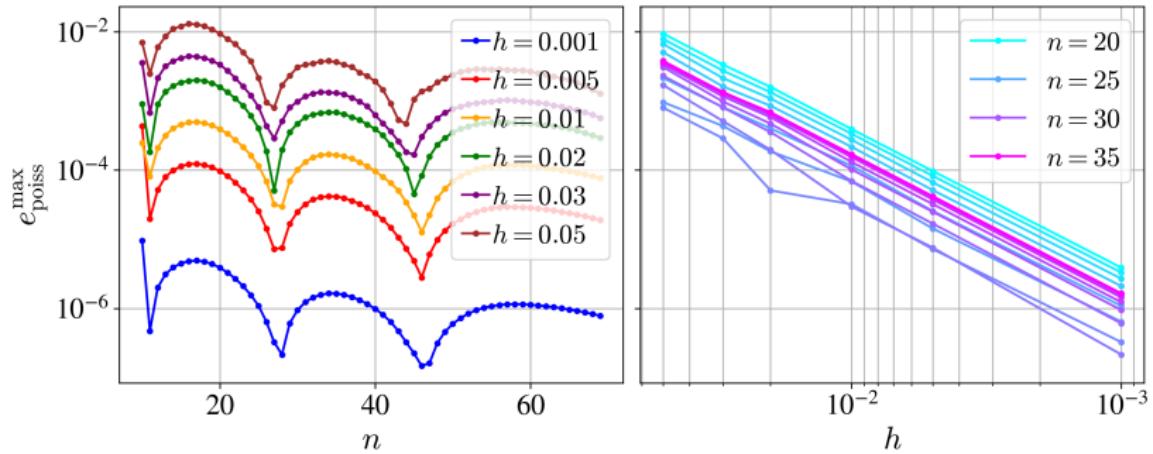
- Solving $\nabla^2 u(x, y) = f(x, y)$ on a disc.
- We choose $u(x, y) = \sin(\pi x) \sin(\pi y)$.

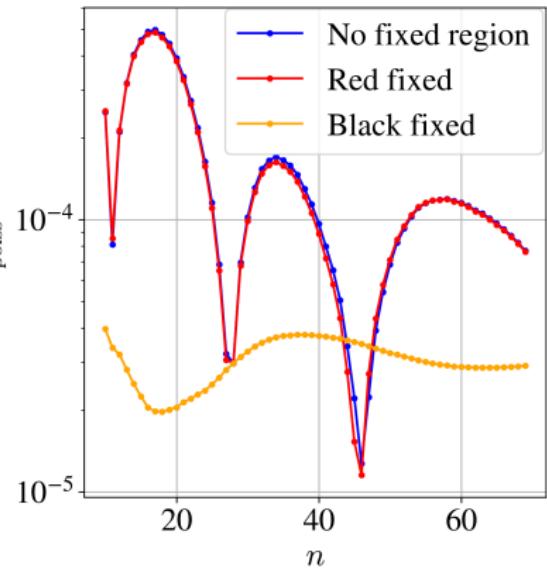
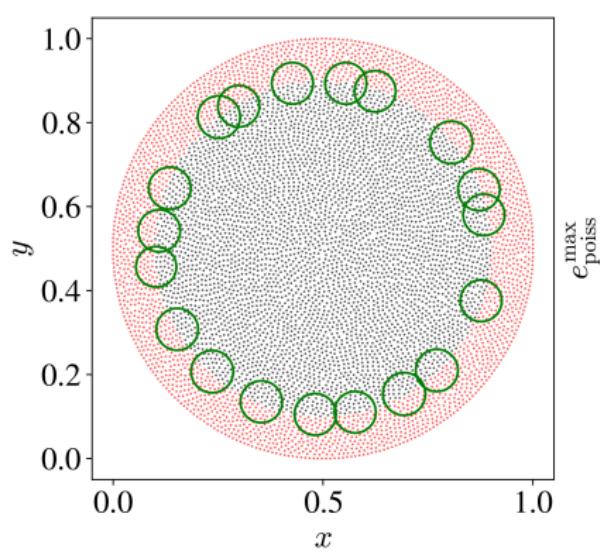
Problem setup

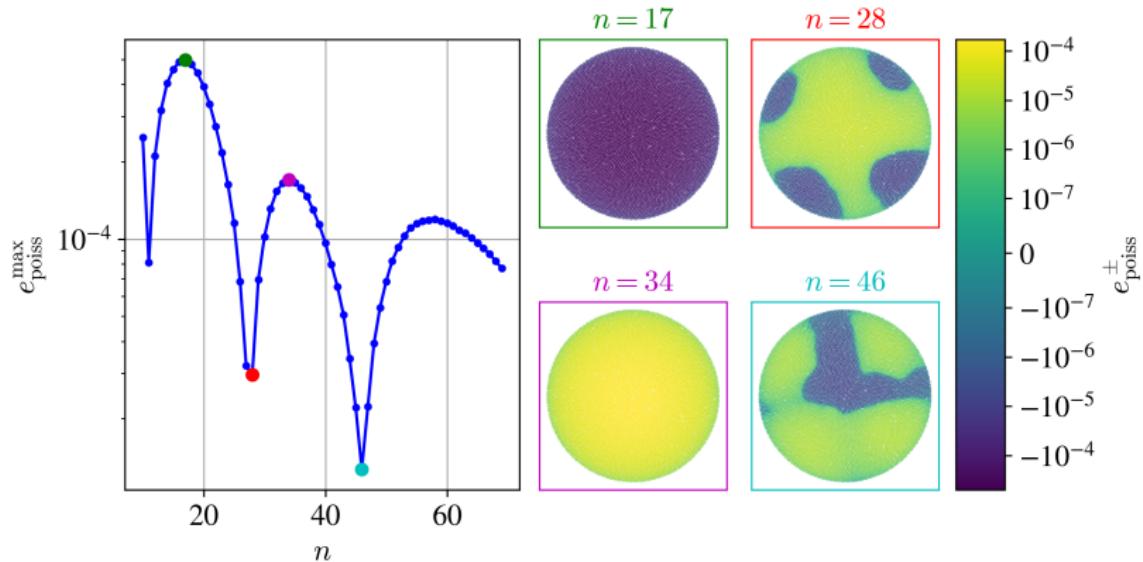
- Solving $\nabla^2 u(x, y) = f(x, y)$ on a disc.
- We choose $u(x, y) = \sin(\pi x) \sin(\pi y)$.
- Observe the errors $e_{\text{lap}}^\pm(\mathbf{x}_i) = \hat{\nabla}^2 u_i - f_i$, $e_{\text{poiss}}^\pm(\mathbf{x}_i) = \hat{u}_i - u_i$.











$$\delta N_{\text{poiss}}^{\pm} = \frac{1}{N_{\text{int}}} \left(|\{x_i \in \mathring{\Omega} : e_{\text{poiss}}^{\pm}(x_i) > 0\}| - |\{x_i \in \mathring{\Omega} : e_{\text{poiss}}^{\pm}(x_i) < 0\}| \right)$$

$$\delta N_{\text{poiss}}^{\pm} = \frac{1}{N_{\text{int}}} \left(|\{x_i \in \mathring{\Omega} : e_{\text{poiss}}^{\pm}(x_i) > 0\}| - |\{x_i \in \mathring{\Omega} : e_{\text{poiss}}^{\pm}(x_i) < 0\}| \right)$$

