ε-rank estimations for $\mathcal{H}$-matrix subblocks of the Helmholtz equation

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Abstract: $\mathcal{H}$-matrix techniques are known to be an efficient tool for solving linear systems arising from PDEs with asymptotically smooth kernel (e.g. the Laplace kernel). However, for highly oscillatory kernels (e.g. the Helmholtz kernel for large wave numbers), methods based on these techniques lose their advantage. In this talk, we want to investigate the order of rank growth (w.r.t. the wave number) for different subblock choices. First, we will show some brand new theoretical results obtained by Engquist and Zhao and provide insight in the main ideas of the theory. Then we will see in the numerical tests that there is indeed a signicant influence of the geometrical constellation of the two subblock index sets on the order of rank growth.