



*Institute of Mathematical Research
Department of Mathematics*

COLLOQUIUM

Domain Decomposition for high frequency Helmholtz problems

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Abstract

We present a new theory of additive Schwarz-type preconditioners for solving finite element approximations of the high-frequency Helmholtz equation with absorbing boundary conditions. The subdomain and coarse grid problems in the preconditioner are obtained as low-dimensional reductions of a nearby problem with added artificial absorption. This set-up allows rigorous estimates of the norm and field of values of preconditioned matrices which are explicit in the level of absorption and also in the wavenumber. The analysis covers both left and right preconditioning via a duality argument. The flexibility of domain decomposition methods allows the insertion of local solvers which are suitable for high-frequency problems. The analysis depends in part on frequency-explicit estimates for the underlying continuous PDE problem.

The talk will include joint work with Eric Chung, Euan Spence, Eero Vainikko and Jun Zou.

Date: August 4, 2017 (Friday)

Time: 2:30 – 3:30pm

Venue: Room 210, Run Run Shaw Bldg., HKU