## DISCRETE SCHWARZ METHODS: DISCRETIZATIONS OF CONTINUOUS SCHWARZ METHODS?

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## Abstract

Schwarz domain decomposition methods have been developed at two different levels: at the continuous level for partial differential equations (the historical Schwarz alternating method by Schwarz himself in 1869, and a parallel Schwarz method by Lions in 1988), and at the discrete level for linear systems (multiplicative and additive Schwarz by Dryja and Widlund in 1987, and more recently restricted additive Schwarz and additive Schwarz with harmonic extension by Cai and Sarkis en 1999, discovered by a programming error).

I will first show in my talk similarities and differences between the classical continuous and discrete Schwarz methods. I will then introduce at the algebraic level a new class of Schwarz methods, called optimized Schwarz methods, which converge significantly faster than classical Schwarz methods, at the same cost per iteration. I will conclude with three important open problems in this area of research.