

Matrix Computations & Scientific Computing Seminar

Organizer: James Demmel & Ming Gu

Wednesday, 4:10–5:00pm, 939 Evans (**Special time and location**)

Dec. 07 **James Bremer**, UC Davis

Recent progress in integral equation methods

Despite offering significant advantages over more direct approaches, integral equation methods are not widely used for the numerical solution of elliptic boundary value problems. This is primarily due to several unresolved issues which hamper the competitiveness of integral equation methods in certain situations. In this talk, I will describe several of these unresolved issues and discuss one in detail.

In particular, I will focus on recent work regarding the numerical solution of integral equations given on domains with singularities. Solutions of integral equations arising from elliptic boundary value problems given on irregular domains often exhibit singularities which are more severe than those exhibited by the solution of the original equation. This is sometimes cited as a serious drawback of integral equation methods. In fact, as I will show, it turns out to be essentially harmless.

If time permits, I will also discuss the efficient evaluation of a class of singular integrals which arises from the discretization of integral equations on surfaces.