

**AAA-least squares rational approximation and  
solution of Laplace problems**

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In the past five years, computation with rational functions has advanced greatly with the introduction of the AAA algorithm for barycentric rational approximation and of lightning least-squares solvers for Laplace, Stokes, and Helmholtz problems. Here we combine these methods into a two-step method for solving planar Laplace problems. First, complex rational approximations to the boundary data are determined by AAA approximation, locally near each corner or other singularity. The poles of these approximations outside the problem domain are then collected and used for a global least-squares fit to the solution. Typical problems are solved in a second of laptop time to 8-digit accuracy, all the way up to the corners. This is joint work with Stefano Costa.