

1173-76-119

Sergey Dyachenko* (sergeydy@buffalo.edu), University of Buffalo, 244 Mathematics Building, Buffalo, NY 14260, and **Alexander Dyachenko** and **Vladimir Zakharov**. *The Tale of Two Branch Points: A New Look at 2D Potential Flows*. Preliminary report.

A potential flow of an ideal fluid with a free surface and infinite depth is considered in 2D. The fluid dynamics can be fully characterized by the motion of a pair of square-root branch points in the analytic continuation of both the conformal mapping and the complex velocity. We derive exact equations describing the evolution of analytic functions defining fluid flow along a cut in complex plane. The equations show that in general case surface remains smooth at all times, new integrals of motion are discovered. A connection to vortex sheet problem is conjectured. Analytical results are supported by numerical simulations. (Received September 18, 2021)