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Post-breakup solutions of Navier-Stokes and Stokes threads JENS EGGERS, Univ of Bristol — We consider the breakup of a fluid thread, neglecting the effect of the outside fluid (or air). After breakup, the solution of the fluid equations consists of two threads, receding rapidly from the point of breakup. We show that the bulk of each thread is described by a similarity solution of slender geometry (which we call the thread solution), but which breaks down near the tip. Near the tip of the thread the thread solution can be matched to a solution of Stokes' equation, which consists of a finger of constant spatial radius, rounded at the end. Very close to breakup, the thread solution balances inertia, viscosity, and surface tension (Navier-Stokes case). If however the fluid viscosity is large (as measured by the dimensionless Ohnesorge number), some time after breakup the thread solution consists of a balance of surface tension and viscosity only (Stokes case), and the thread profile can be described analytically.

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