Motion of a Vortex Filament in the Local Induction Approximation: Reformulation of the Da Rios-Betchov Equations in the Extrinsic Filament Coordinate Space BHIMSEN SHIVAMOGGI, University of Central Florida, GERT JAN VAN HEIJST, Eindhoven University of Technology, Eindhoven, The Netherlands — In recognition of the highly non-trivial task of computation of the inverse Hasimoto transformation mapping the intrinsic geometric parameter space onto the extrinsic vortex filament coordinate space a reformulation of the Da Rios-Betchov equations in the latter space is given (Shivamoggi and van Heijst [1]). The nonlinear localized vortex filament structure solution given by the present formulation is in detailed agreement with the Betchov-Hasimoto solution in the small- amplitude limit and is also in qualitative agreement with laboratory experiment observations of helical-twist solitary waves propagating on concentrated vortices in rotating fluids. The present formulation also provides for a discernible effect of the slipping motion of a vortex filament on the vortex evolution via an amplitude change in the vortex kink.

[1] B. K. Shivamoggi and G. J. F. van Heijst: *Physics Letters A*, (2010).

Bhimsen Shivamoggi
University of Central Florida

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