HIROTA EQUATION AND VORTEX FILAMENTS

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By using the Inverse Scattering Transform we construct an explicit soliton solution formula for the Hirota equation. The formula obtained allows one to get, as a particular case, the N -soliton solution, the breather solution and, most relevantly, a new class of solutions called multipole soliton solutions. We use these exact solutions to study the motion of a vortex filament in an incompressible Euler fluid with nonzero axial velocity. This is a joint work with G. Ortenzi (University of Bergamo), and C. van der Mee (University of Cagliari).