

EXACT ANALYTICAL SOLUTIONS FOR NONLINEAR DYNAMICS OF DIPOLE VORTEXES WITH SOLAR APPLICATIONS

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A localized as well as long-time static dipole vortex is one of the fundamental structures of two dimensional flows in magnetized plasmas. Relaxation in two dimensions leads to reduction of the nonlinear evolution equations. We obtain several classes of exact solutions for those equations. Initially unstable nonlinear dipoles may reorganize to stable ones. Some of them are adequate to represent magnetic fields at the solar surface and above it. They yield several kinds of structures.