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Magnetic Separatrices and QSLs in Solar Eruptions[1] VIACHESLAV TITOV, ZORAN MIKIC, JON LINKER, ROBERTO LIONELLO, TIBOR TOROK, Predictive Science, Inc. — Numerical magnetohydrodynamic (MHD) simulations of the solar corona make it now possible to model dynamic evolution of realistic magnetic configurations. However, such configurations are so complex that their understanding requires development of sophisticated techniques for analyzing 3D magnetic field structure. We present the current state of the art, illustrating it with some examples from our on-going projects on modeling of solar eruptions. We emphasize the role of separatrix surfaces and quasi-separatrix layers (QSLs) in erupting magnetic flux ropes. Our techniques allow us to: (1) identify the multiple-stranded structure of these ropes; (2) determine evolving magnetic fluxes for each such strand; (3) relate certain structural features to observational features, such as Hα flare ribbons, extreme-ultraviolet dimmings, and X-ray sigmoids in solar eruptions. The latter is particularly important, since it enables us to verify the MHD models and to understand how the coronal magnetic field opens in observed eruptions.

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