1033-53-244 **Jason Parsley***, Dept. of Mathematics, Wake Forest University, P.O. Box 7388, Winston-Salem, NC 27109-7388. *On certain vector field invariants in R^3.* Preliminary report.

Motivated by the utilization of Bott-Taubes integration for defining finite-type invariants for knots, we explore the construction of invariants for vector fields on domains in R^3. As our underlying example, we aim to understand the helicity of a vector field, which measures how much its flowlines coil and wrap around one another, and is related to the linking numbers of curves. Helicity is invariant under one-parameter volume-preserving diffeomorphisms of the domain and arises naturally in plasma physics. (Received September 11, 2007)