



Scientific visualization has many effective methods for examining and exploring scalar and vector fields, but rather fewer for bivariate fields. We report the first general purpose approach for the interactive extraction of geometric separating surfaces in bivariate fields. This method is based on fiber surfaces: surfaces constructed from sets of fibers, the multivariate analogues of isolines. We show simple methods for fiber surface definition and extraction. In particular, we show a simple and efficient fiber surface extraction algorithm based on Marching Cubes. We also show how to construct fiber surfaces interactively with geometric primitives in the range of the function. We then extend this to build user interfaces that generate parameterized families of fiber surfaces with respect to arbitrary polygons. In the special case of isovalue-gradient plots, fiber surfaces capture features geometrically for quantitative analysis that have previously only been analysed visually and qualitatively using multi-dimensional transfer functions in volume rendering. We also demonstrate fiber surface extraction on a variety of bivariate data.

Paper



Video

