Fault detection from scattered data

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Detecting discontinuity curves of bivariate functions, usually called faults (or gradient faults if gradient discontinuities are considered), is an important issue in several applications, including image processing and geophysics (see, e.g., [1, 4, 5]). The problem we consider is determining which points in the scattered data set lie close to a (gradient) fault. The selection is based on the values of indicators obtained by using numerical differentiation formulas which can be directly applied to the set of scattered data (see [2]). The obtained point cloud surrounding the discontinuity can be then employed to recover the fault shape by using suitable least squares approximations (see [3]). If needed, the final approximation of the fault can be constructed by applying a suitable curve fitting algorithm. We present several examples, including applications to edge detection and fracture detection in geological data.

References

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