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Xianfu Wang* (shawn.wang@ubc.ca), **Honglin Luo** (071025013@fudan.edu.cn) and **Lukens Brett**. *Variational analysis on the signed distance functions.*

The signed distance function (or oriented distance function) of a set in a metric space determines the distance of a given point from the boundary of the set, with the sign determined by whether the point is in the set or in its complement. The knowledge of signed distance functions is a very valuable information in various fields of applied mathematics such as collision detection, binary classification, shape analysis, fuzzy numbers ranking and level set methods. One distinguished feature of the signed distance function is that it reflects the geometric structure of the set much better than the distance function does. We explore many interesting analytical properties of signed distance functions, and use the signed distance function to construct convex functions with nonconvex subdifferential domains. (Received January 28, 2018)