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Tianran Chen* (chentia1@msu.edu). *A homotopy method for locating critical points with a given Morse-index.*

The problem of locating the critical points of a real-valued functions is an important problem in physics, chemistry, engineering, and mathematical biology. Among a wide range of different computational approaches for finding critical points, the homotopy continuation methods have been proved to be a versatile family of numerical methods that offers some unique advantages.

It is often the case that critical points having a certain Morse-index are of special interest. Examples include the study of atomic clusters where critical points of Morse-index 1 corresponds to the “transition states” between stable configurations. This talk discusses a specialized homotopy construction that directly targets the real critical points of a given Morse-index. (Received January 19, 2015)