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"On Morse index recovering"

Abstract: Let f be a smooth real-valued function without critical points defined in a neighbourhood of the unit sphere S^{d-1} . Imagine we know that f can be extended to a function F in the unit ball B^d in such a way that F is a Morse function with a unique critical point at the origin.

We shall discuss the problem of up to what extent one can recover the Morse index of the critical point of F from the knowledge of f only. It is easy to show that one can always recover the parity of the Morse index. Somewhat counter-intuitively, it turns out that in some cases one can say nothing more.