

Vertical Developments of a Convex Function

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Abstract: In this paper we compare two different approaches to analyse the second-order behaviour of a convex function. The first one is classical, we call it the *horizontal approach*; the second one is more recent, it is the *vertical approach*. We prove equivalences between horizontal and vertical growth conditions. Then we derive well-known directional results. Finally we show that the vertical approach is particularly interesting to get more than a first-order (and more than directional) analysis of the maximum eigenvalue function.

Keywords: Convex analysis, second-order derivative, approximate subdifferential, semidefinite programming

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