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Relation between Roots and Tangent Lines of Function in Fractional Dimensions: A Method for Optimization Problems

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Abstract : In this paper, a basic schematic of fractional dimensional optimization problem is presented. As will be shown, a method is performed based on a relation between roots and tangent lines of function in fractional dimensions for an arbitrary initial point. It is shown that for each polynomial function with order N at least N tangent lines must be existed in fractional dimensions of 0 < α < N+1 which pass exactly through the all roots of the proposed function. Geometrical analysis of tangent lines in fractional dimensions is also presented to clarify more intuitively the proposed method. Results show that with an appropriate selection of fractional dimensions, we can directly find the roots. Method is presented for giving a different direction of optimization problems by the use of fractional dimensions.

Keywords : tangent line, fractional dimension, root, optimization problem
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