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In this paper, an adaptive methodology is proposed to numerically optimize functions using multicomplex algebras and their corresponding matrix representations. The methodology employs multicomplex Taylor series expansion (MCTSE) and generalized Newton method to adaptively approximate and optimize functions using sufficiently small number of points. Extensive simulation studies are conducted to evaluate the performance of the proposed methodology. The proposed approach can be applied to situations, where number of possible function evaluations is limited while high level of accuracy is needed. (Received September 21, 2015)