

A Survey on Fixed Point Iterations in Modular Function Spaces and an Application to Ode

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Abstract : This research presents complementary results with wider applications on convergence and rate of convergence of classical fixed point theory in Banach spaces to the world of the theory of fixed points of mappings defined in classes of spaces of measurable functions, known in the literature as modular function spaces. The study gives a comprehensive survey of various iterative fixed point results for the classes of multivalued ρ -contractive-like, ρ -quasi-contractive-like, ρ -quasi-contractive, ρ -Zamfirescu and ρ -contraction mappings in the framework of modular function spaces. An example is presented to demonstrate the applicability of the implicit-type iterative schemes to the system of ordinary differential equations. Furthermore, numerical examples are given to show the rate of convergence of the various explicit Kirk-type and implicit Kirk-type iterative schemes under consideration. Our results complement the results obtained on normed and metric spaces in the literature. Also, our methods of proof serve as a guide to obtain several similar improved results for nonexpansive, pseudo-contractive, and accretive type mappings.

Keywords : implicit Kirk-type iterative schemes, multivalued mappings, convergence results, fixed point

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