

Fixed Point Theorems and its Applications [†]

R. K. George ^{1,*}

¹ Dept. of Space, Indian Institute of Space Science and Technology, Govt. of India, Trivandrum;

* Correspondence: rkg.iist@gmail.com (R.K.G.);

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Abstract: Fixed point theorems refer to a variety of theorems that all state that a transformation (mapping) from a set to itself has at least one point that remains unchanged under the transformation. Fixed points theorem is of vast use in qualitative analysis as well as in computational algorithms. Among other applications, they are used to show the existence and uniqueness of the solution to a system of equations, differential equations, and integral equations, as well as the existence of equilibria in game theory. This talk discusses the most commonly used fixed point theorems, namely, Brouwer's Fixed Point Theorem, Schauder's Fixed Point Theorem, and Banach Fixed Point Theorem. We also discuss some of its applications, like the existence and uniqueness of solutions of a system of linear equations, Nonlinear Differential Equations, and Integral equations. We also demonstrate how the fixed point theorems can be used as a tool to establish the controllability of nonlinear control systems.

Keywords: fixed point theorems; nonlinear differential equations, and integral equations.

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Conflicts of Interest

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