

EXISTENCE RESULT FOR SYSTEM OF FRACTIONAL DIFFERENTIAL EQUATIONS WITH NONLINEAR BOUNDARY CONDITIONS

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Abstract. In the present paper, we prove the existence of solution of nonlinear boundary value problem for weakly coupled system of Riemann-Liouville fractional differential equations. By introducing the notion of quasi solutions, upper and lower solutions, we develop the monotone iterative technique together with monotone iterative scheme and prove existence of solution of nonlinear boundary value problem. Lastly we illustrate our result with the help of suitable example.

Keywords. Nonlinear boundary value problem, System of fractional differential equation, Upper lower solutions, Quasi solutions, Monotone iterative technique, Existence result.

AMS (MOS) subject classification: 26A33, 34A08, 34A12, 34B15.

1 Introduction

Fractional differential equations play an important role in the field of science and engineering (see [17],[23],[24],[31] and references therein). The monotone iterative technique is constructive and computational technique used in the study of qualitative properties of solution of various problems. The existence and uniqueness of solution of nonlinear fractional differential equations [1]-[9],[12]-[15],[19]-[22],[28],[29], [32]-[40] as well as system of nonlinear fractional differential equations [10], [11], [16],[18],[25]-[27] with different boundary conditions are studied by various researchers. Recently, Dhaigude and Chitalkar [8] have obtained existence and uniqueness of solution of nonlinear boundary value problem for Riemann-Liouville fractional differential equations. In this paper we extend the results in [8] to nonlinear weakly coupled system of Riemann - Liouville fractional differential equations with nonlinear boundary value conditions. We develop monotone iterative technique and prove exist-