

SOLUTIONS OF RIEMANN-LIOUVILLE FRACTIONAL MATRIX DIFFERENTIAL EQUATIONS

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Dedicated to Prof. M.A. Pathan on his 75th birth anniversary

Abstract: In this paper we have obtained solutions of Riemann - Liouville fractional matrix differential equation (RLFMDE) of the form $D^q X = AX$ and $D^q X = AX + XB$. We have extended these results to 2^{nd} order and 3^{rd} order RLFMDE and then generalized them to n^{th} order RLFMDE.

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1. Introduction

Matrix is an essential basic element for modeling many physical phenomena where interconnections between variables have to be considered. Such physical phenomena exist in all disciplines such as social, physical and biological sciences, computer sciences and robotics to name a few. As physical systems vary with time, it is quite natural to study the rate of change of these phenomena with respect to time. Thus the study of Matrix differential equations had attracted the attention of many scientists.

Bellman in his book [6] studied Matrix differential equations of the type