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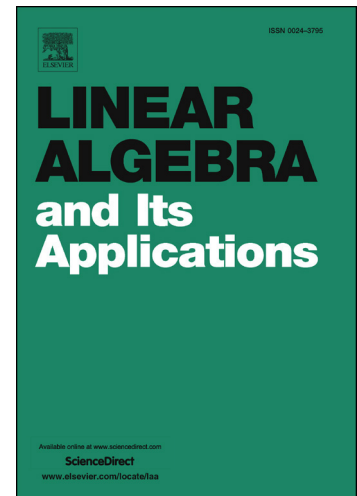
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Analogues of Reliability Analysis for Matrix-variate Cases

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Abstract

An attempt is made in this paper to extend various aspects of reliability analysis in the real scalar variable case to the corresponding real matrix-variate cases. Probability of a matrix random variable being bigger than a given matrix is defined in terms of norms and positive definite matrices. Then by using these definitions, various aspects of reliability analysis are extended to the corresponding matrix-variate cases. A multivariate, in the sense of many real scalar variables, pathway model is also defined and some probabilities connected with reliability are also evaluated here.

Keywords: Reliability analysis, real matrix-variate case, survival function in matrix-variate case, risk function, matrix-variate pathway model, multivariate pathway model

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1. Introduction

Let x denote the lifetime of a component in a machine or system or the lifetime of the system itself. Then x is a real scalar positive variable having its own distribution. Let $[0, t]$ be an observation period or a preassigned time t . Then the probability that the component lifetime survives this period or its lifetime x exceeds t is the survival function $S(t) = Pr\{x > t\}$. This is also called the reliability function. Suppose

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