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## AN OVERVIEW OF RECENT DEVELOPMENTS IN FUNCTIONS OF MATRIX ARGUMENT

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**Abstract:** The purpose of this article is to introduce the readers, especially the researchers, to some topics connected with functions of matrix argument, scaling models, distributions of products and ratios, Bayesian structures, symmetric products and symmetric ratios of matrices, scalar and matrix-variate fractional integrals, functions of matrix argument through entropy optimization, singular matrix-variate gamma and beta functions etc which are currently active so that interested readers can get into these classes of problems for their current research or teaching. Let  $X$  be a  $p \times q$ ,  $p \leq q$  matrix of rank  $p$  in the real domain. If the function  $f(X)$ , associated with  $X$ , is a function of  $XX'$ , where a prime denotes the transpose, then such a function appears in a number of different disciplines. This paper examines the recent developments in such matrix-variate functions when  $X$  is in the real or complex domain. Connections to Bayes procedures, quantum physics, scalar and matrix texture models in communication and engineering problems, fractional integrals, distributions of symmetric products and symmetric ratios of matrices, singular matrix-variate gamma and beta functions and other related areas are pointed out. Only an overview of the current research in these topics with some illustrative examples are given in this paper. Since the material is summarized from the author's own works, most of the references are author's own papers, and hence similarity index, similarity with author's own works, may be high. The materials also cover some current results which are being published.