



ÇANKAYA UNIVERSITY  
FACULTY OF ARTS AND SCIENCES  
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCES

# SEMINAR

## Robust Statistical Estimates Based on the Fractional Calculus

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### Abstract

Fractional calculus is a generalization of classical calculus. The robust statistic is a statistic which can have an advantage to manage getting the efficient estimates for the parameters when we have a non-identically distributed data set. The robust statistic uses the estimating equations to derive the estimates. In the framework of the estimating equations, the combination score functions of normal (Gaussian) and Laplace distributions can be gotten. While deriving the score functions, the classical calculus is used. In this study, we used the operators in fractional calculus. Since the score function of Laplace we derived with the operators in the fractional calculus is the function of  $x$ , we have the information of  $x$ . It is observed that the simulation results for the estimates of parameters approve the theoretical results. The mean squared errors of estimates for the score functions derived with the operators in the fractional calculus have smaller than that of ones derived with the classical calculus. As a conclusion, the information of  $x$  has been gained via the operators in the fractional calculus.

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