

# Identification of Linear Fractional Systems of Commensurate Order

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**Abstract:** The identification of fractional order systems is a more difficult problem than the integer order systems because it requires not only the estimation of the model coefficients but also the determination of the fractional orders with the tedious calculation of fractional order derivatives. This paper addresses the identification of linear fractional systems of commensurate order. The proposed identification method is based on the recursive least squares algorithm applied to a linear regression equation derived from the linear fractional order differential equation using adjustable fractional order differentiator. The proposed technique does not require a prior knowledge of the commensurate order of the fractional linear differential equation. The derived formulations of the identification scheme are presented. Illustrative examples are also presented to validate the proposed linear fractional systems of commensurate identification approach.

**Keywords :** Least squares method, Linear fractional differential equation, Recursive identification.