

A Mathematical Model Approach Regarding the Children's Height Development with Fractional Calculus

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Abstract : The study aims to use a mathematical approach with the fractional calculus which is developed to have the ability to continuously analyze the factors related to the children's height development. Until now, tracking the development of the child is getting more important and meaningful. Knowing and determining the factors related to the physical development of the child any desired time would provide better, reliable and accurate results for childcare. In this frame, 7 groups for height percentile curve (3th, 10th, 25th, 50th, 75th, 90th, and 97th) of Turkey are used. By using discrete height data of 0-18 years old children and the least squares method, a continuous curve is developed valid for any time interval. By doing so, in any desired instant, it is possible to find the percentage and location of the child in Percentage Chart. Here, with the help of the fractional calculus theory, a mathematical model is developed. The outcomes of the proposed approach are quite promising compared to the linear and the polynomial method. The approach also yields to predict the expected values of children in the sense of height.

Keywords : children growth percentile, children physical development, fractional calculus, linear and polynomial model

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