

Title: Design and Error Analysis of Fractional Delay Systems

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Abstract

Fractional delay systems are basic components for processing discrete-time signals. In this talk, I will present an analysis of fractional delay systems in time domain. Based on Taylor expansion of signals, I explicitly calculate the difference between the ideal delayed signal and the signal outputted from a fractional delay system. The difference can be represented as a convolution of the derivative of the input signal and a function called the Peano kernel. I will give a closed-form expression of the Peano kernels. The weighting coefficients of the system are also solved in closed-form. Some sufficient conditions for stability are derived based on the coefficients.