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Fractional derivative for finding width, amplitude and shape of overlapping peaks

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Abstract

This work describes a technique based on fractional derivative for finding the overlapping peaks spectral parameters. This is due to positive effects of the fractional derivative caused by the behavior of its zero-crossing and maximal amplitude. A power of the method is demonstrated for synthetic data by using the well-known distributions such as Lorentzian, Gaussian ones and for experimental infra-red spectra coming from molecular spectroscopy. It is shown that recorded spectra are approximated with the Tsallis distribution in the best way, compared to the distributions above mentioned.

Keywords

Amplitude, Fractional derivative, Overlapping peaks, Shape, Width