A Workshop on Future Directions in Fractional Calculus Research and Applications

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Data-Driven FPDE Modeling and Simulation

Abstract

We introduce a new mathematical-computational framework, in which the corresponding fractional operators are iteratively constructed from observable data. This is done via the development of a new computational sensitivity analysis technique that is coupled with an operator-based uncertainty quantification framework. The corresponding sensitivity and uncertainty fields together provide the inputs of our convergent algorithm, leading to capturing the underlying fractional orders from available data.