SOLVING ORDINARY DIFFERENTIAL EQUATIONS – FROM THE WORST-CASE TO QUANTUM SETTING

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The solution of ordinary differential equations is an important topic in numerical analysis. It has been widely studied within the information-based complexity framework. In this talk, we shall discuss complexity results for initial- and boundary-value problems. We start by showing matching upper and lower complexity bounds in the worst-case setting. We show that the worst-case results can be used to analyze the problems in the asymptotic setting. We further discuss initial-value problems in the randomized and quantum settings. It turns out that the problem complexity is reduced by switching to these less conservative settings. We explain some aspects of the complexity reduction, and present problems that still remain open.