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On some properties of Euler scheme for DDEs and ODEs under nonstandard assumptions and noisy information

The classical literature concerning problem of approximation of ODEs and DDEs solutions assume some regularity of the right-hand side function of the initial value problem, commonly Lipschitz condition. Meanwhile, it turns out that the real world applications are modeled by suitable ODEs and DDEs under nonstandard assumptions. For example, a phase change of metallic materials can be modeled by DDE with a non-Lipschitz right-hand side function, see [5, chapter 3.3] and [4,3].

The talk will be divided into two parts. Firstly, we will consider a DDE case with a multidimensional right-hand side function which is also locally Hölder continuous and fulfills one-side Lipschitz condition [1]. Then, we will sketch an ODE case with a multidimensional right-hand side function where assumptions about it are also nonstandard and we allow a presence of informational noise [2]. In the both cases we show the results concerning the upper bounds on the error of the Euler scheme applied to such ODEs or DDEs. Finally, results of numerical simulations will be presented.

References

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