Rigorous Numerics for Dissipative PDEs

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I would like to introduce the basics of a numerical method by Piotr Zgliczynski (Krakow), that can produce rigorous results and proofs for a certain class of dissipative partial differential equations. It starts with a spectral-type decomposition in the Fourier domain, then we separate the important coefficients and track their dynamics, while we use some uniform argument for the rest. In my work we are trying to generalize this method and weaken some of the conditions. The algorithm is realized as a computer program, thus during the implementation one must take extra care with accepting the results from the pc. For this reason, I would like to introduce the basic concepts of interval arithmetics and automatic differentiation as well; these tools make possible to produce real `mathematical proofs` with the aid of the computer.