Finite element methods respecting the discrete maximum principle for convection-diffusion equations II

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This talk is a second part of a joint presentation with Volker John (see the abstract of Part I for an introduction into the topic). The talk will be devoted to the numerical solution of both steady-state and time-dependent convection-diffusion-reaction equations and, in contrast to Part I, it will present examples of nonlinear finite element methods methods satisfying the discrete maximum principle (DMP). In fact, it turns out that, for steady-state problems, all successful finite element approaches satisfying the DMP are nonlinear, which will be also illustrated by numerical results. The talk will concentrate on conforming P_1 finite elements and results for other types of finite elements will be mentioned only briefly.

This talk is based on a joint review paper with Gabriel R. Barrenechea and Volker John.

References:

[1] https://arxiv.org/abs/2204.07480

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