Report on the Master Thesis "Convex hull properties for parabolic systems of partial differential equations"

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The author presents in his theses some investigations on weak maximum principles and its vector valued counterpart, the *convex hull property*. The thesis contains new results for linear and non-linear systems of elliptic and parabolic partial differential equations. The main novelty is the proof of the parabolic convex hull property for the parabolic p-Laplacian. By the introduced methods lower order terms might be included. Respective bounds for more general couplings even for second order linear ordinary differential equations are not possible as is shown by a couple of counter-examples. The additional restriction on the coefficients for parabolic systems is also shown to be sharp with a respective counterexample.In conclusion a nice and complete characterization of systems where the *convex hull property* is satisfied is introduced. This is in coherence with the results in (Gershon Kresin and Vladimir Maz'ya. Maximum Principles and Sharp Constants for Solutions of Elliptic and Parabolic Systems (2012)). Moreover, it improves several of the results in that book.

The thesis is written very well and the results is good and new. The state of the art are outlined well and the proofs seem to be correct and complete. Hence indeed, the thesis of Antonín Češík satisfies all requirements expected from a master thesis and I strongly recommend it to be successfully defended.

Dr. Sebastian Schwarzacher 29.8.2019