Existence and non-existence results for a higher order parabolic equation

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SUMMARY

We consider the initial-boundary value problem for the partial differential equation

$$u_t + \Delta^2 u = \det(D^2 u) + \lambda f.$$

This problem may present a gradient flow structure depending on the boundary conditions. Based on our previous results on the existence of stationary solutions to this model [3, 4, 5], we prove local in time existence of solutions for arbitrary data and global in time existence of solutions for small data [2]. Depending on the boundary conditions and the associated presence of a variational structure in the equation as well as on the size of the data we prove blow-up of the solution in finite time and convergence to a stationary solution in the long time limit [2]. If time allows we will briefly mention our results concerning self-similar solutions to this partial differential equation [1].

Keywords: Higher order parabolic equations, global solutions, blow-up in finite time.

AMS Classification: 35K25, 35K55, 35G31.

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