

## The cauchy problem for a complex-valued heat equation with a quadratic nonlinearity

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### Abstract:

We study the Cauchy problem for a system of parabolic equations which is derived from a complex-valued equation with a quadratic nonlinearity. First we show that if the convex hull of the image of initial datum does not intersect the positive real axis, then the solution exists globally in time and converges to the trivial steady state. Next, on the one dimensional space, we provide some simultaneous blow-up solutions with nontrivial imaginary part. Finally, we consider the case of asymptotically constant initial data and show that, depending on the limit, the solution blows up non-simultaneously at space infinity or exists globally in time and converges to the trivial steady state. This talk is based on a joint work with Ninomiya, Shimojo and Yanagida.