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Matthew A Fury* (maf44@psu.edu), Penn State Abington, 1600 Woodland Road, Abington, PA 19001. *Regularization of nonautonomous ill-posed problems from linear to quasi-linear*. Preliminary report.

A common approach to studying an ill-posed problem involves the regularization of the problem in which a known solution is approximated by the solution of a closely-defined well-posed problem. This method has been studied in recent literature for several versions of the abstract Cauchy problem $du/dt = Au, 0 \leq t < T, u(0)$ where A is an operator in a Banach space, and with applications to a wide class of partial differential equations including the backward heat equation. In this presentation, we will review recent results proved by the author concerning the regularization of nonautonomous ill-posed problems where the operator A is replaced by the nonconstant operator $A(t)$. We will highlight the differences in the structure of the regularization depending on the properties of the operators $A(t)$ and also depending on the type of problem being considered such as inhomogeneous, or semi-linear, for example. Finally, an introduction to quasi-linear equations will be given with a discussion on how regularization may be extended to such problems. (Received September 11, 2013)