# Recent Progress in SONIC

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We will present a short overview of our solver SONIC followed by a more detailed presentation of some features. SONIC contains a verified solver and optimizer for nonlinear equation systems and is achieving rigor by working with interval arithmetics using different interval libraries such as C-XSC and filib++.

Focus will be put on the utilization of the extended Newton method in a hierarchy of extended systems, i.e., systems with additional variables for subterms in the original system. In particular the usage of different preconditioners in this method will be considered.

We will also discuss whether restricting the method to a subset of variables may diminish the computational costs on large extended systems while still providing good results.