

# An ILU that incorporates the growth of the inverse triangular factors

Matthias Bollhöfer  
Department of Mathematics  
Berlin University of Technology  
D-10623 Berlin, Germany

bolle@math.tu-berlin.de

[www.math.tu-berlin.de/~bolle/](http://www.math.tu-berlin.de/~bolle/)

## Abstract

In this talk we will present an ILU with pivoting that monitors the growth of the inverse triangular factors of the decomposition. This information is used to control dropping of “small” entries. The goal of this kind of dropping is to construct more robust preconditioners. We will discuss how the information of the inverse triangular factors is coupled with the dropping and the pivoting process. Two versions of this ILU based on adapting existing algorithms will be presented. One version is based on MA50, a sparse direct Gaussian elimination method from the Harwell Subroutine Library. Another version is constructed from ILUTP, an incomplete LU decomposition from SPARSKIT. The improvements are illustrated for several numerical examples.

**Keywords:** sparse matrices, ILU, sparse approximate inverse, condition estimation, pivoting.  
**AMS subject classification:** 65F05, 65F10, 65F50.