1125-65-1610 **Daniel Szyld*** (szyld@temple.edu), Philadelphia, PA, **Steven Shank** (sshank@mit.edu), Cambridge, MA , and **Valeria Simoncini**, Bologna, Italy. *Classical iterative methods for the solution of Generalized Lyapunov Equations.*

There has been a flurry of activity in recent years in the area of solution of matrix equations. In particular, a good understanding has been reached on how to approach the solution of large scale Lyapunov equations. An effective way to solve Lyapunov equations is to use Galerkin projection with appropriate extended or rational Krylov subspaces. Computations are performed usually with low rank storage.

In this talk we focus on generalized Lyapunov equations, which have additional terms in the matrix equation. Several authors have proposed to use approximations to conjugate gradients or to BiCGStab, appropriately preconditioned, where the basis vectors (matrices) and iterates are "truncated" throughout the algorithm to keep all these elements represented by low-rank matrices.

In the present work, we propose a return to classical iterative methods, and consider instead stationary iterations, where the classical theory of splittings applies, and we present a new theorem on the convervgence when the linear system at each step is solved inexactly.

Numerical experiments show the competitiveness of the proposed approach. (Received September 18, 2016)