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Constantin Bacuta* (bacuta@math.udel.edu), University of Delaware, 501 Ewing Hall,
Newark, DE 19716. *Saddle Point System Discretization Without the Discrete LBB Condition.*

Based on spectral results for the Schur complements we find or improve convergence results for Arrow-Hurwitz and the inexact Uzawa algorithm on general Hilbert spaces. We prove that for any symmetric saddle point problem, the inexact Uzawa algorithm converges, provided that the inexact process for inverting the residual at each step has the relative error smaller than any fixed number smaller than $1/3$. As a consequence, we provide a new type of algorithm for discretizing saddle point problems, which combines the inexact Uzawa iterations with standard a posteriori error analysis and does not require the discrete stability (LBB) condition. (Received January 29, 2008)