1046-45-1484 **Cara D. Brooks*** (brooks1@rose-hulman.edu), 5500 Wabash Ave. CM 139, Terre Haute, IN 47803, and **Patricia K. Lamm**. *Extensions to the theory of local regularization for solving linear Volterra inverse problems.* Preliminary report.

We extend the theory of local regularization for solving linear, first kind Volterra convolution equations with finitely smoothing kernels to allow for the underlying data spaces $L^p[0,1], 1 < p < \infty$. To do so, modifications must be made to the conditions established by P.K. Lamm for convergence with data in $C[0,1]$. This includes specifying appropriate families of signed measures appearing in the second-kind Volterra equation associated with local regularization and giving further conditions to guarantee well-posedness of the equation for all values of the regularization parameter in a designated interval. We prove that these modifications are sufficient to ensure that solutions to the second-kind Volterra equation, based on exact data, converge to the problem's true solution in $L^p[0,1]$. We also provide an *a priori* parameter selection strategy so that solutions, based on inexact data, converge to the problem's true solution in $L^p[0,1]$ as the noise level and regularization parameter shrink to zero, i.e. the resulting local regularization method is L^p-convergent. Furthermore, we establish a rate of L^p-convergence of approximations satisfying the source condition of uniform Hölder continuity. (Received September 15, 2008)