Meeting: 1004, Bowling Green, Kentucky, SS 1A, Special Session on Numerical Analysis, Approximation, and Computational Complexity: Interdisciplinary Aspects

1004-65-7 **Jiu Ding*** (Jiu.Ding@usm.edu), Dept of Math, Univ of Southern Mississippi, Hattiesburg, MS 39406-5045, and **Noah Rhee** (rheen@umkc.edu), Dept of Math and Statistics, Univ of Missouri at Kansas City, Kansas City, MO 64110-2499. *Integral and Positivity Preserving Approximations of Functions with Application to Markov Operators.*

Let f be a Lebesgue integrable function of one or two variables defined on an interval or a square, respectively. We consider the problem of approximating f by piecewise linear functions associated with triangulations of the domain of f. Motivated by Ulam's piecewise constant approximation scheme, we require the approximation to be *integral preserving* and *positivity preserving*. The resulting approximation scheme preserves the Markov property when applied to numerically computing invariant densities of Markov operators. We present some optimal approximation results based on a strict mathematical analysis, and numerical results are also given to compare the new method with earlier ones. (Received October 26, 2004)