1116-65-2773 **Bongsoo Jang*** (bsjang@unist.ac.r), Ulsan, South Korea, and **Hyunju Kim** (hyunju.kim@ngu.edu), Tigerville, SC 29688. *Numerical solution of fractional differential equations by multistage shifted Jacobi spectral method.* Preliminary report.

In this work, a multistage spectral scheme using shifted Jacobi polynomials is introduced to deal with initial value problems(IVPs) of fractional order. In particular, we employ shifted Jacobi polynomials to construct local basis functions in the sense of spectral method. The locally defined approximation space on the first element is reused to approximate a solution on other non-overlapping elements by updating initial conditions. This technique has two major advantages. First, the matrix in the system is local rather than global and thus can be at very little cost comparing with cost using spectral method. By means of the technique, the good accuracy of the approximate solution is guaranteed throughout over a large domain while as existing spectral methods specialized for solving fractional initial value problems need expensive treatments to handle it. We also propose an improved discrete formulation regarding to the global operator called *memory* in the Caputo fractional derivative and this makes the accuracy of the approximate solution to be higher when the fraction order $0 < \nu \ll 1$. The *memory* associated with shifted Jacobi polynomials will be described as an algebraic expression by using the incomplete beta functions, too. (Received September 22, 2015)