1067-65-1681   **Haijun Yu*** (`hyu@purdue.edu`), 150 N. University Street, West Lafayette, IN 47907, and **Jie Shen** (`shen7@purdue.edu`), 150 N. University Street, West Lafayette, IN 47907. *Fast Spectral Sparse Grid Methods for High Dimensional Non-periodic Problems.*

Based on 1-dimensional fast Chebyshev transform on the Chebyshev-Gauss-Lobatto grid points, we built a fast Chebyshev transform on high dimensional sparse grids(spFCT). This algorithm is further used on function interpolation and solving high-dimensional PDEs with non-periodic boundary conditions. Numerical examples are presented to show the efficiency of the proposed methods in solving elliptic problems. (Received September 21, 2010)