High resolution harmonical synthesis & analysis on the sphere using FFT

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With the release of the Earth Gravitational Model EGM08 a new benchmark in both spatial resolution and computational demand has been set. Base functions have to be provided stable and efficiently among performance and storage issues of slightly minor concerns. The shift to extended precision arithmetic can circumvent numerical problems during computations on one hand but it strongly declines both performance and storage efficiency on the other hand. In our contribution a frequency dependent scaling has been applied during computation of the base functions for the purpose of harmonic transformation by FFT that suffices in standard double precision.
A synthetic model with a resolution beyond 5' x 5' at the surface of the Earth as herald to possible future geopotential models shall be transformed forward and backward with reasonable effort.