Quasi-uniform grids using a spherical helix

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Quasi-uniform grids can be easily generated with a spherical helix without any restriction on the number of grid points n (Rakhmanov et al. 1994; Bauer 2000; Nishio et al. 2006). The north and south poles are connected with a single spherical helix given by a simple equation of the longitude λ and the co-latitude θ

$$\lambda = 2k\theta \bmod 2\pi \tag{1}$$

where k is a parameter. Grids are distributed quasi-uniformly when $k = \sqrt{n\pi}$. The uniformity of the spherical helix grids and that of the geodesic grids Sadourny et al. (1968); Tomita and Satoh (2004) in term of the energy and distance norms. Spherical helix grids are found to be significantly more uniform than geodesic grids, especially when n is large.

References

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