Ville Turunen: *Sampling at equiangular grids on the 2-sphere and estimates for Sobolev space interpolation*; Helsinki University of Technology Institute of Mathematics Research Reports A464 (2003).

Abstract: *We sample functions at $4n^2$ equiangularly spaced points on the unit sphere $\mathbb{S}^2$ of the 3-dimensional Euclidean space, and study the corresponding interpolation projections $Q_n : C(\mathbb{S}^2) \to C(\mathbb{S}^2)$ in the scale of L^2-type Sobolev spaces $H^s(\mathbb{S}^2)$. The main result is that if $-1 < s < t$ and $t > 7/2$ then*

$$\|f - Q_n f\|_{H^s(\mathbb{S}^2)} \leq c_{s,t,\varepsilon}\ n^{s-t}\ n^{4+\varepsilon}\ \|f\|_{H^t(\mathbb{S}^2)},$$

where $c_{s,t,\varepsilon} < \infty$ is a constant depending on s, t and $\varepsilon > 0$. Hence this result is useful only when $t > s + 4$. We also compare our methods to the well-known interpolation on the circle $\mathbb{S}^1$.

AMS subject classifications: 65T40, 33C55, 46E35, 42C10, 65T50.

Keywords: spherical harmonics, sampling, equiangular grid, interpolation, Sobolev space estimates.

Ville.Turunen@hut.fi

ISBN 951-22-6828-0
ISSN 0784-3143

Helsinki University of Technology
Department of Engineering Physics and Mathematics
Institute of Mathematics
P.O. Box 1100, 02015 HUT, Finland
email:math@hut.fi http://www.math.hut.fi/