

## STABILITY RESULTS FOR SCATTERED DATA INTERPOLATION ON THE ROTATION GROUP\*

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**Abstract.** Fourier analysis on the rotation group  $SO(3)$  expands each function into the orthogonal basis of Wigner-D functions. Recently, fast and reliable algorithms for the evaluation of finite expansion of such type, referred to as nonequispaced FFT on  $SO(3)$ , have become available. Here, we consider the minimal norm interpolation of given data by Wigner-D functions. We prove bounds on the conditioning of this problem which rely solely on the number of Fourier coefficients and the separation distance of the sampling nodes. The reconstruction of  $N^3$  Fourier coefficients from  $M$  well separated samples is shown to take only  $\mathcal{O}(N^3 \log^2 N + M)$  floating point operations.

**Key words.** Scattered data interpolation, iterative methods, FFT.

**AMS subject classifications.** 65T50, 65F10, 43A75, 41A05, 15A60.

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