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**Multiple singular values of Hankel operators and weak turbulence in the cubic Szeg  equation**

**Abstract**

We establish an inverse spectral result on compact Hankel operators on the unit sphere. Namely, we describe the set of symbols of compact Hankel operators having a prescribed sequence of singular values. It is done by constructing a one-to-one correspondence between a symbol of a compact Hankel operator and its sequence of singular values as well as some additional spectral parameters.

This one-to-one correspondence plays the role of a non linear Fourier transform for some hamiltonian equation: the cubic Szeg  equation. It allows to obtain explicit formulae of the solutions and to prove a wave turbulence phenomenon: for a dense  $G_\delta$  of initial data, solutions develop large oscillations on small space scales. It is from joint works with Patrick G rard.

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