Mapping properties of Fourier transforms in function spaces, some recent results

Dorothee D. Haroske
Friedrich Schiller University Jena, Germany

We study continuous and compact mappings generated by the Fourier transform between distinguished Besov spaces $B^s_{p,p}(\mathbb{R}^n)$, $1 \le p \le \infty$, and between Sobolev spaces $H^s_p(\mathbb{R}^n)$, $1 < p < \infty$. Here we rely mainly on wavelet expansions, duality and interpolation of corresponding (unweighted) spaces, and (appropriately extended) Hausdorff-Young inequalities. The degree of compactness will be measured in terms of entropy numbers and approximation numbers, now using the symbiotic relationship to weighted spaces. We can also characterise the situation when the Fourier transform acts as a nuclear operator.

This is joint work with Leszek Skrzypczak (Poznań) and Hans Triebel (Jena).