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Spatial transport vs. spectral transfer in NS turbulence JACQUES LEWALLE, Syracuse Univ. — Aside from source/production and dissipation terms, the spatial representation of the equations for momentum (Navier-Stokes), vorticity, kinetic energy, etc., includes the divergence of fluxes, which are interpreted as (spatial) transport. Viscous diffusion, for example, is a momentum transport term; however for energy it combines transport and dissipation. A similar pattern holds for the nonlinear terms. In the Fourier representation, the viscous term becomes dissipative only, whereas the non-linear terms are reinterpreted as (spectral) transfer terms. Here, we focus on the **wavelet** representation, in which both transport and transfer terms can be identified. The unique analytical properties of the Mexican hat wavelet yield manageable exact equations, which show that all transfer terms are also transport terms, but the converse is not true; and that the interpretation of terms as transport, transfer and/or other (production / dissipation / non-local exchanges) is not unique. A physical basis for the selection of the various options will be discussed, in the broad context of intermittent cascades and modeling.

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