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Principal Direction of Scalar Transport in Wall Turbulence[1] CHIRANTH SRINIVASAN, DIMITRIOS PAPAVASSILIOU, The University of Oklahoma — Lagrangian scalar tracking in conjunction with direct numerical simulation is utilized in an infinitely long channel to study the principal direction of scalar transfer for both forwards and backwards single particle dispersion. Four regions are of interest: the viscous sub-layer, the transition region (between the viscous sublayer and the logarithmic region), the logarithmic region and the center of channel. Fluctuating velocities of scalar markers released in the flow field are correlated forwards and backwards in time to find the components of the correlation coefficient tensor. Eigenvalues and eigenvectors are obtained for both the forwards and backwards dispersion and for fluids with Prandtl number between 0.1 and 1000. The largest eigenvalues are higher in the case of backwards dispersion compared to the case of forwards dispersion. The eigenvector inclinations relative to the yz plane are different for forwards and backwards dispersion (at times comparable to the Lagrangian timescale).

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