

Couplet, M.; Sagaut, P.; Basdevant, C.

Intermodal energy transfers in a proper orthogonal decomposition-Galerkin representation of a turbulent separated flow. (English) [Zbl 1063.76570](#)

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Summary: Energy transfers between modes obtained from the proper orthogonal decomposition (POD) of a turbulent flow past a backward-facing step are analysed with the aim of providing guidelines for modelling unresolved modes in truncated POD-Galerkin models. It is observed that energy transfers are local in the POD basis, and that the Fourier-decomposition-based concepts of forward and backward energy cascades are also valid in the POD basis, the net effect being a forward energy cascade. General features of the eddy-viscosity representation of kinetic energy transfers are investigated through a priori tests. It is observed that the ideal eddy-viscosity model should exhibit a cusp behaviour near the cutoff mode.

MSC:

[76F25](#) Turbulent transport, mixing

[76M22](#) Spectral methods applied to problems in fluid mechanics

Cited in **28** Documents

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