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An Upper Bound on Transport Processes in Turbulent Thermohaline Convection

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ABSTRACT

A simple variational approach to turbulent transfer problems is applied to the analytical prediction of upper bounds on the vertical transport of heat and solute in bounded systems with negative vertical gradients of temperature and solute concentration. The results are consistent with previous studies of the special case of thermal convection. It is found that the presence of solute inhibits transport and that for sufficiently high concentration gradients no convection is possible.

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