

AVERAGING THEOREMS AND AVERAGED EQUATIONS FOR TRANSPORT OF INTERFACE PROPERTIES IN MULTIPHASE SYSTEMS

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Abstract—Theorems which relate averages of surface derivatives to spatial derivatives of surface averages are derived. The theorems are then applied to balance equations for surface properties in multiphase systems. Macroscopic point equations complementing the macroscopic equations for bulk phases are obtained which allow for a more complete fundamental description of multiphase transport.

Key Words: multiphase flow, porous media, averaging theory, surface properties, macroscopic equations, transport phenomena, flow physics, interface properties