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On the Basic Equations for the Second-order Modeling of Compressible Turbulence

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Abstract

Equations for the mean and the turbulence quantities of compressible turbulent flows are derived in this report. Both the conventional Reynolds average and the mass-weighted Favre average were employed to decompose the flow variable into a mean and a turbulent quantities. These equations are to be used later in developing second-order Reynolds stress models for high-speed compressible flows. A few recent advances in modeling some of the terms in the equation due to compressibility effects are also summarized.