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ON VISCO-THERMAL ACOUSTIC WAVE PROPAGATION: NEW REDUCED MODEL AND FEM IMPLEMENTATION WITHIN ACTRAN CODE – ADMOS 2013

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ABSTRACT

This work provides an extension of a visco-thermal acoustic fluid model called "Low Reduced Frequency" model. It consists in taking into account the interaction of a mean flow and acoustic perturbations inside small waveguides (ducts of thin layers). The principles of the derivation are presented in such a way to reduce the full set of linearized Navier-Stokes-Fourier equations. The implementation strategy of such new formulation is investigated in order to fit with specific industrial finite element code requirements. Automotive catalytic converters can be seen as a net of thin exhaust ports in parallel with mean flow propagating inside. This "eXtended Low Reduced Frequency" formulation is used to provide a representative model for this kind of industrial application using ACTRAN code.