

# On the Numerical Solution of Non-Equilibrium Condensation of Steam in Nozzles and Cascades

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## Abstract

Recent “International Wet Steam Modelling Project” promoted by Joerg Starzmann showed necessity for further development of models, numerical methods and experiments for flow of condensing steam. Current simulations are based on condensation models, which require fine tuning of several parameters to fit the condensation start as well as the correct size of droplets. Such tuning can be sensitive and may depend on the properties of used numerical method. Further improvement of condensation models is impossible without new more detailed experimental data, which should be available in near future and also without detailed knowledge of behavior of numerical methods for current models. The aim of present work is to study the sensitivity of numerical solution related to modifications of thermodynamic model, to discretization of computational domain especially within the nucleation zone, to accuracy of numerical method and to the algorithm for time integration for several examples of non-equilibrium condensation in nozzles and turbine cascades.

## References

1. J. STARZMANN ET AL.. Results of the international wet steam modelling project. Proceedings of Wet Steam Conference Prague 2016, 146-170.
2. J. HALAMA AND F. BENKHALDOUN AND J. FORT. Flux Schemes Based Finite Volume Method for Internal Transonic Flow with Condensation. Int. Journal for Numerical Methods in Fluids 65, (2011) 953-968.