APPLICATION OF ANSA MORPHING AND OPTIMIZATION TOOLS TO AUTOMOTIVE HVAC SYSTEM

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ABSTRACT–
In automotive design, new optimization procedures, which can improve system internal aerodynamics are needed. In this field of application, the challenge is to choose a suitable parametrization of the typical complicated geometry and to modify the shape complaining with space constraints.

In this paper, two automatic optimization processes, with the aim of increase HVAC system efficiency, by means of reducing duct total pressure drop and improving outlet flow uniformity, are shown. The first one consists in generating many new duct designs using ANSA mesh morphing tools and analyse them with ANSYS Fluent®. The second one makes use of ANSYS Fluent adjoint solver sensitivity map to steer duct deformation by means of ANSA direct morphing tools. The two optimization methods are applied to a real car HVAC duct and CFD simulation results of optimized models are examined and compared with the original one.