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## STS

# Advanced Numerical Methods for Simulation, Optimisation and Validation for Applications in Aeronautics and Industry

### 2200

**Dietrich Knoerzer[1] and Jacques Periaux[2]**

[1] Aeronautics Consutant, Brussels, Belgium, dietrich.knoerzer@outlook.com
[2] CIMNE, Barcelona, Spain, jperiaux@gmail.com

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## Abstract

Advances in numerical methods together with the availability of high-performance computers (HPC) allow to address highly complex design problems and challenging multi-disciplinary optimisation issues. The integration of artificial intelligence (AI) and of machine learning features will enhance this development.

Significant advances in adjoint methods have enabled efficient and accurate computation of shape gradients for high-dimensional and high-fidelity aerodynamic shape optimisation problems [1].

A shape optimisation of functional surfaces presents a multifaceted challenge, characterized by numerous geometric, functional, and performance constraints. This is particularly evident in vehicle design, where modern simulation processes have to address a wide spectrum of requirements [2].

In this STS, different novel methods will be discussed, which are aiming to accelerate CFD simulations used to design aeronautics components like aircraft wings, profile shape and other aeronautics or industry components associated with direct design using high-fidelity analysis.

## References

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