使用神经网络模型的竞争型飞行器优化设计

神经网络系统：人工智能中的关键技术之一，作为自主学习的代理模型

竞争型多目标优化设计：纳什均衡理论

代理模型容易出现维度爆炸问题，而竞争型的纳什均衡理论则将设计变量根据优化目标分开，使得代理模型中的维度减少，天然具有配合优势。

设计变量提取： CST方法表达二维或三维外形

神经网络训练：

优化算法设计及与Pareto策略的比较

Our research covers the key areas of aerospace engineering, including aerodynamics, acoustics, autonomous systems, and engineering design and optimisation. In strong collaboration with the aerospace industry, we undertake cutting-edge research of practical importance using both experimental and computational approaches.

The aim of our research is to develop the understanding and modelling capability which would enable the development of tomorrow's aerospace technologies.

Key people

* [Professor Dominique Laurence](http://www.mace.manchester.ac.uk/people/staff/profile/?ea=dominique.laurence) - Aerodynamics
* [Dr Philip Bonello](http://www.mace.manchester.ac.uk/people/staff/profile/?ea=Philip.Bonello) - Dynamics
* [Dr Qingming Li](http://www.mace.manchester.ac.uk/people/staff/profile/?ea=Qingming.Li) - Impacts
* [Dr Mark Quinn](http://www.mace.manchester.ac.uk/people/staff/profile/?ea=mark.quinn) - Hypersonic flows
* [Dr Alistair Revell](http://www.mace.manchester.ac.uk/people/staff/profile/?ea=alistair.revell) - Computational fluid dynamics
* [Professor Costas Soutis](http://www.mace.manchester.ac.uk/people/staff/profile/?ea=constantinos.soutis) - Composites, School of Materials

[Dr Shan Zhong](http://www.mace.manchester.ac.uk/people/staff/profile/?ea=shan.zhong) - Experimental aerodynamics

This specialism uses sophisticated mathematical methods in order to find the solution to various engineering problems related to design. Engineering design and optimisation covers spacecraft design, structural analysis, gas-cooled systems in nuclear industry and methods for engineering optimisation.

Research focus

Research within this specialism looks at:

* design
* multiobjective optimisation
* multidisciplinary design
* advanced mathematical methods in engineering design

methods of active wave control

Erfani, T., Utyuzhnikov S.V. Control of robust design in multiobjective optimization under uncertainties. Structural and Multidisciplinary Optimization. 2012 February; 45(2): 247-256. eScholarID:[146565](http://www.manchester.ac.uk/escholar/uk-ac-man-scw:146565) | DOI:[10.1007/s00158-011-0693-0](http://dx.doi.org/10.1007/s00158-011-0693-0)

People

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*Please contact one of the academic staff for further details of current research activity.*