Fundamentals and Applications of Unified Dynamic Similitude

Lecture by prof. **Mayo Adetoro**

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Dr. Mayo Adetoro is a Senior Lecturer in Aerospace Engineering and serves as the Director of Teaching and Learning at the Department of Mechanical and Aerospace Engineering, Brunel University London. With over 15 years of expertise, his research has primarily focused on the analytical and numerical modelling of fluid and solid continua. Dr. Adetoro has been a prominent speaker at various international forums, notably co-chairing the prestigious NUMISHEET 2016 and nanoMan2018 international conferences and the co-editor of conference proceedings. He earned his PhD with a thesis on the bifurcation of dynamical machining systems using periodic delay-differential equations and the Floquet theorem. He has developed several analytical models including for the first 3D model for flip bifurcation using floquet thoery for machining processes. He along with a colleague developed a new yield function for the plastic flow of anisotropic metals with any crystallographic structure and asymmetric behaviour in tension-compression. His contributions to aerospace engineering include the patented development of an analytical method for the 3-point bending of elongate aircraft wing stringers, which ensures accuracy from the first production—the "right-first-time" approach. He was the academic programme director at the Airbus Academy for F&DT. Most recently, he developed the unified thermo-dynamic similitude model which is presented during this lecture series. His current research focuses on high-fidelity modelling of turbulence to improve the accuracy of fluid-structural interaction simulations and the continued advancement and applications of the unified similitude model.

Day 1 / 22 July 2024 / 3 hours / 9:00-12:00 / Aula MM / Via Claudio
The Unified Dynamic Similitude Model with Mechanical and Aeroelastic Applications
It will be given an introduction with some historical context to the unified approach to similitude first from fluid continuum and very quickly move to the published work on the model for solid continuum. Then, different applications of the model in purely mechanical processes will be presented and also a touch on aeroelastic applications will be given.

Day 2 / 23 July 2024 / 3 hours / 9:00-12:00 / Aula MM / Via Claudio
The Unified Dynamic Similitude Model with Damping and Thermomechanical Applications
Here, very recent works will be presented that are going for publication very shortly. This will involve recent works on including damping forces in the similitude model and, secondly, on extending the model to the thermo-mechanical process.

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