

Annual General Meeting of the IMA North West Branch
and Invited Lecture

**Using Eulerlets: a new description of Euler flow
for manoeuvring bodies**

Edmund Chadwick
(University of Salford)

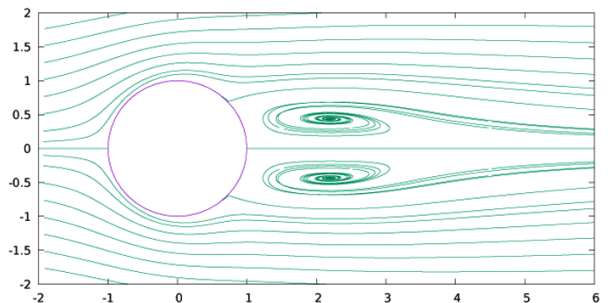
Monday 30 April 2018, from 5.30 pm

Frank Adams Room 1

Alan Turing Building, University of Manchester, M13 9PL

Consider a manoeuvring body in a fluid such as a plane, submarine, ship, fish, or bird. Consider sufficient high Reynolds number that Euler flow is a good approximation. Unfortunately, traditional Euler flow models have significant theoretical drawbacks, in particular D'Alembert's paradox and non-uniqueness. We introduce a new Euler model that overcomes these deficiencies thereby making it more amenable to modelling next generation flapping and swimming

unmanned, robotic air and sea vehicles. The new model overcomes existing theoretical drawbacks by considering Euler flow as a near-field flow, and matching asymptotically to a far-field viscous Oseen flow. Then, D'Alembert's paradox is resolved, insight into the Kutta condition related to uniqueness is provided, and a new Euler wake flow, called the slip Euler wake is obtained. The theory is partially verified against uniform flow past a circular cylinder and compared against experiment, and a new set of experimental tests is proposed for an aerofoil, which would provide a definitive test, but not performed.



5:30–5:45pm	Light Refreshments
5:45–6:00pm	Annual General Meeting
6:00–7:00pm	Invited Lecture

For further information, please contact Margaret Eastwood margareteastwoodimanw@gmail.com

No charge is made to attend meetings. Non-IMA members are welcome.

Please see <https://ima.org.uk/branches/north-west/> for the Draft Lecture Schedule for 2017-2018