

**Speaker:** Luke Shaw, Universidad Jaume I, Spain

**Title:** A New Optimality Property of Strang's Splitting

**Abstract:** For systems of the form  $\dot{q} = M^{-1}p$ ,  $\dot{p} = -Aq + f(q)$ , common in many applications, we analyze splitting integrators based on the (linear/nonlinear) split systems  $\dot{q} = M^{-1}p$ ,  $\dot{p} = -Aq$  and  $\dot{q} = 0$ ,  $\dot{p} = f(q)$ . We show that the well-known Strang splitting is optimally stable in the sense that, when applied to a relevant model problem, it has a larger stability region than alternative integrators. This generalizes a well-known property of the common Störmer/Verlet/leapfrog algorithm, which of course arises from Strang splitting based on the (kinetic/potential) split systems  $\dot{q} = M^{-1}p$ ,  $\dot{p} = 0$  and  $\dot{q} = 0$ ,  $\dot{p} = -Aq + f(q)$ .