Title: Stability and conservation for numerical differential equations

Speaker: Prof. Emeritus John Butcher

G-stability, introduced by G. Dahlquist in 1975, has inspired the study of similar dissipativity conditions for Runge-Kutta and general linear methods. For problems in which there is a quadratic invariant, canonical Runge-Kutta methods can be constructed which preserve the invariant numerically. These methods have an important role in the solution of Hamiltonian problems because they also conserve symplectic behaviour. We will consider how to extend the canonical structure to general linear methods. Although these new methods can suffer from parasitic behaviour, the harmful effects of parasitism can be overcome using composition or by the construction of special methods free from this disadvantage.