CONFERENCIA

John Hearne

(Royal Melbourne Institute of Technology, Melbourne, Australia)

Modelling to mitigate the effects of bushfires

Wildfires are a global problem of particular significance in Australia. Following the loss of 173 lives in the 'Black Saturday' fires in Victoria in 2009 a Royal Commission made 67 recommendations. Of these about 15 are best dealt with using mathematical models. A brief survey of some of these problems will be given followed by a more detailed account of two models that we have recently developed. The Royal Commission recommended that 5% of public land be burnt each year to reduce fuel loads in the landscape. The question arises as to when and where to burn. There are ecological and other constraints that need to be considered. Furthermore vegetation types differ in their tolerance towards the frequency of fire events. A spatiotemporal mixed integer programming model will be presented to deal with this problem. The model will be illustrated with some simple examples. This will be followed by a case study in a real landscape. When a fire escalates to the stage where suppression is no longer effective Incident Management Teams (IMT) come under intense pressure. Critical decisions have to be made regarding the allocation of resources to protect assets. Using a fire spread model and a map, a time window can be identified for each asset in a landscape for undertaking protection tasks (such as hosing down a structure). In their decisionmaking IMT's need to consider the capabilities of each resource under their control, the capabilities required at each asset to complete the required task, as well as the timewindows and the road network. This can be considered as a variant of the teamorienteering problem . The formulation and application of a MIP model for dealing with this problem will be presented and discussed.

Fecha: 27 de junio de 2016 (lunes)

Hora: 12,30 horas

Lugar: Seminario Sixto Ríos (Aula 215)

Facultad de CC. Matemáticas, UCM

Organizado por el Departamento de Estadística e Investigación Operativa con la colaboración del Instituto de Matemática Interdisciplinar