PhD Position at the School of Mathematics, the University of Edinburgh

Preventing wide-area blackouts through adaptive islanding of transmission networks

Recently there have been several cases of cascading faults in electricity transmission networks which have lead to large parts of the US, UK and Europe being blacked out. In the future commercial pressures towards better utilisation of power networks and increased penetration of distributed generation are likely to reduce power system security margins and increase the frequency of blackouts. EPSRC has funded a project from its "Energy Challenges for Complexity Science" scheme to investigate how imminent wide-area blackouts could be prevented by intentional splitting of a system into islands with as good as possible balance between generation and demand. Such splitting will reduce the total amount of load that would otherwise be lost, and will make restoring the supply easier. The project is supported by the National Grid and Psymetrix Ltd.

This interdisciplinary engineering-mathematical project will gather power system engineers from Institute for Energy Systems (IES), and operational research and optimization experts from School of Mathematics in the University of Edinburgh, power system Engineers from the University of Durham and graph theoreticians from the University of Southampton.

One of the PhD studentships will be based in the Edinburgh University School of Mathematics and the student will join the OR/Optimization Group (see http://www.maths.ed.ac.uk/ERGO/).

PhD in School of Mathematics, Edinburgh University
Fast methods for the islanding problem
The main task of OR/Optimization group is to implement fast methods for the islanding problem.

The work of this PhD student will involve development and efficient implementation of optimization techniques, heuristics for graph partitioning and their application to islanding transmission networks.

Necessary background
You should possess a first degree in Mathematics, or Operational Research, Computer Science or Engineering with a strong mathematical background. Minimum requirement is an Upper Second Class degree or equivalent. An MSc in a related area and/or experience in computer programming, knowledge of optimization techniques. or electricity networks would be a bonus.

Funding for PhD studentships
Funding for Home/EU students:
EPSRC will cover your tuition fees (GBP 3,400 in 2009/10) and you will be paid a stipend to cover your living expenses (GBP 13290 tax-free in 2009/10). Funding will continue for 3.5 years and will be at a similar rate.

Funding for Overseas (non-EU) students:
If you are coming from outside the EU then you will receive the same funding as EU students (Home/EU fee + stipend, please as above) but you will have to pay the difference between the Home/EU and non-EU tuition fee from another source. In 20010/11 the difference will be GBP 7,400.

Contact:
Professor Ken McKinnon, email: K.McKinnon@ed.ac.uk , tel +44 (0) 131 650 6542
Professor Jacek Gondzio, email: J.Gondzio@ed.ac.uk , tel. +44 (0) 131 650 8574