Title
Modelling movement in electrical machines

Description
Modelling movement for the general case where the path of the moving parts is not known in advance can be very expensive. Many solutions of non linear equations by time stepping techniques can be required. In addition, the finite element model mesh will change with time and remeshing or some other strategy will be required.

In the majority of electrical machines, the movement is along a well defined path, such as the cylindrical airgap of a rotary machine, or along a plane for a linear machine. Over the years since publishing the method in 1990 we have used Lagrange multipliers to join moving and stationary meshes.

Another simplification is possible where the moving object is physically invariant in the direction of motion. Here the Minkowski transform may be used, so that one steady state solution can be carried out instead of many time transient solutions.

The paper will outline some of the many possible formulations and provide examples.

Presenter
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Bio
Dave received the BSc (Eng) and PhD degrees from Aberdeen University.
He worked at the University of Bath as a research officer, lecturer, senior lecturer and professor from 1977-2008.
He left the university to start Bathwick Electrical Design Ltd, which is a company specialising in the development and marketing of finite element software, consulting and developing novel electrical machines and drive systems.
At present the company are working on machines for wave energy and other high torque applications such as wind turbines.