

PHASE FIELD FINITE ELEMENT METHODS FOR MODELLING FRACTURE PROPAGATION IN BRITTLE ELASTIC MATERIALS



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Our research project is focused on the development of an efficient numerical simulation method, known as the phase field finite element method, for modelling the propagation of fractures in brittle-elastic materials.

COMPETITIVE ADVANTAGE

The phase field finite element method is an innovative numerical simulation technique that:

- Models the development of new surfaces or fractures where separation occurs within a material
- Does not exhibit a heavy dependency on the mesh geometry used for simulations or require frequent and time-consuming mesh regeneration steps to be performed as many competing techniques do
- Can be implemented within the standard finite element framework familiar to many engineers

SUCCESSFUL APPLICATIONS OF RESEARCH

- The method has been successfully applied to model load-displacement responses and crack paths for a range of laboratory-scale fracture tests

IMPACT

- Provides engineers with tools for analysing the performance of equipment and structures built from brittle-elastic materials
- Potential for improvements in the efficiency and reliability of equipment and structures built from brittle elastic materials

CAPABILITIES AND FACILITIES

- A full-functionality phase field finite element code is currently under development