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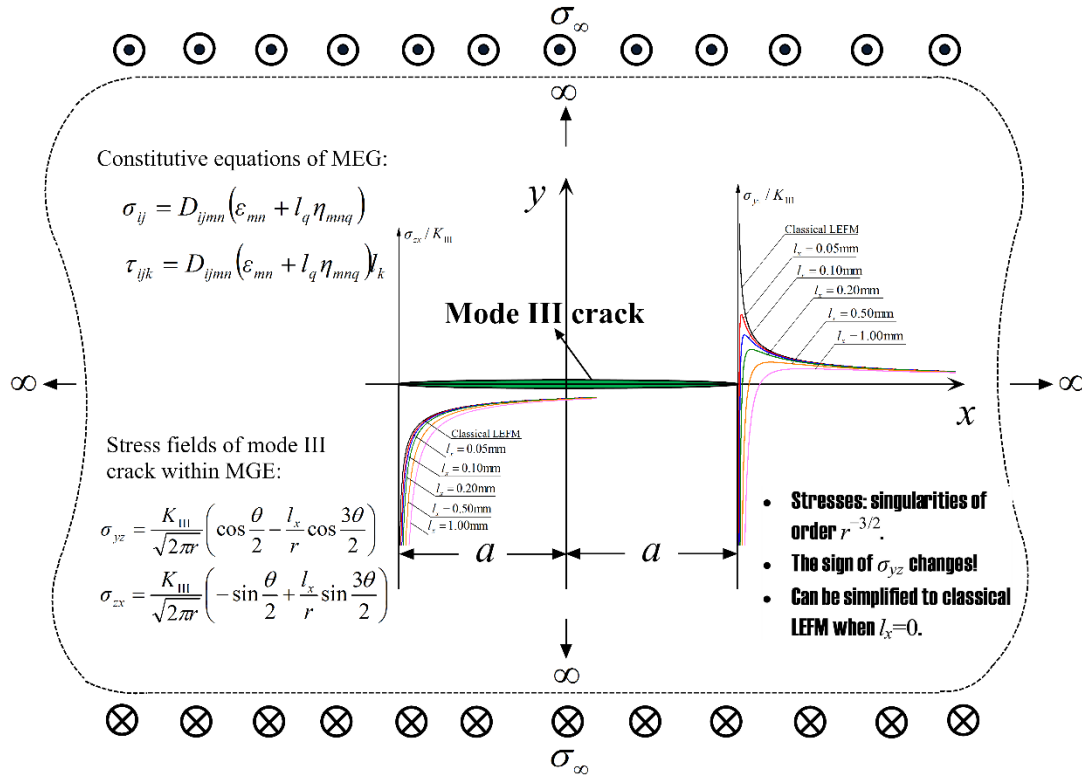
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## A stress analytical solution for Mode III crack within modified gradient elasticity<sup>#</sup>

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### Graphical abstract



**Graphical abstract: A stress analytical solution for Mode III crack within modified gradient elasticity**

### Highlights

- A stress analytical solution for Mode III crack within MGE theory is deduced.
- The shear stresses at crack tip within MGE have singularities of order  $r^{-3/2}$ .
- When  $l_x=0$ , the stress fields within MGE can be simplified to classical LEFM.
- The stresses' peak value is attained at a finite distance from the fracture vertex.
- The influence of strain gradient for mode III crack problem cannot be ignored.

**ABSTRACT:** The strain gradient exists near a crack tip may significantly influence the near-tip stress field. In this paper, the strain gradient and the internal length scales are introduced into the basic equations of mode III crack by the modified gradient elasticity (MGE). By using a complex function approach, the analytical solution of stress fields for mode III crack problem is derived within MGE. When the internal length scales vanish, the stress fields can be simplified to the stress

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