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SIF DETERMINATION USING IMAGE PROCESSING TECHNIQUES

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ABSTRACT

This work is focused on a hybrid methodology for the determination of the stress intensity factor (SIF) parameter. A combination of experimental and numerical procedures is used to compute the SIF based of linear elastic fracture mechanics concepts. Specimens loaded in mode I and mix mode (I and II) were used. In each specimen a fatigue crack was obtained from a notch machined by electrical discharge machining.

Using the strain field around the crack tip obtained experimentally with the digital correlation method, Figure 1, stresses were assessed applying theory of elasticity equations. The obtained data was used as input to the implemented over-determined numerical algorithm and the stress intensity factor solutions for different crack lengths were then obtained.

The system was solved in the least-square approach using the over-deterministic algorithm.

Results were validated with SIF solutions obtained using the Dual Boundary Element Method (DBEM).

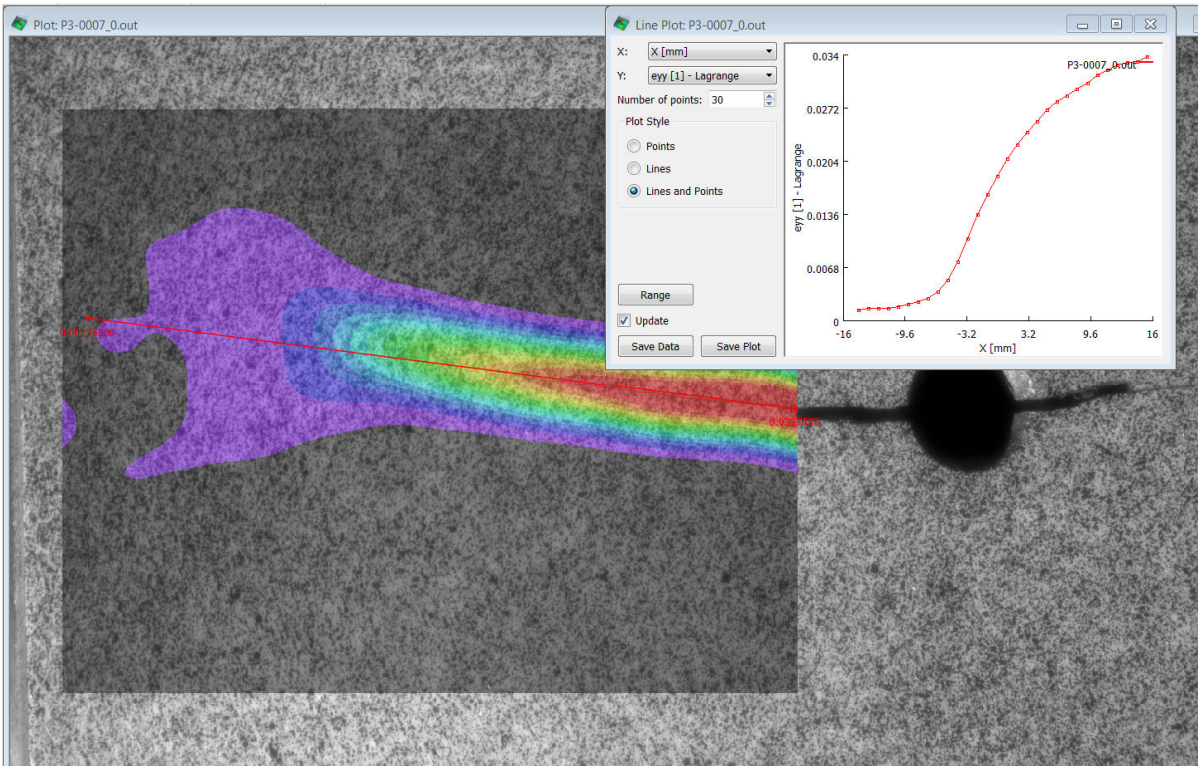

Fig. 1 - Experimental strain results around a crack tip

Keywords*:* digital image correlation, overdeterministic method, stress intensity factor.

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