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Estimation of mixed-mode stress intensity factors using digital image correlation and an interaction integral

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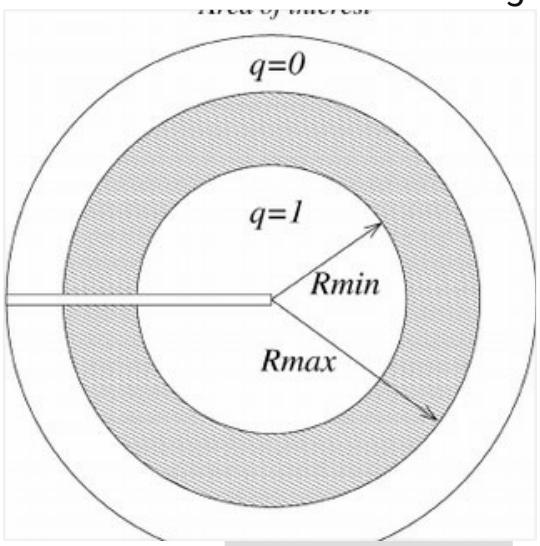
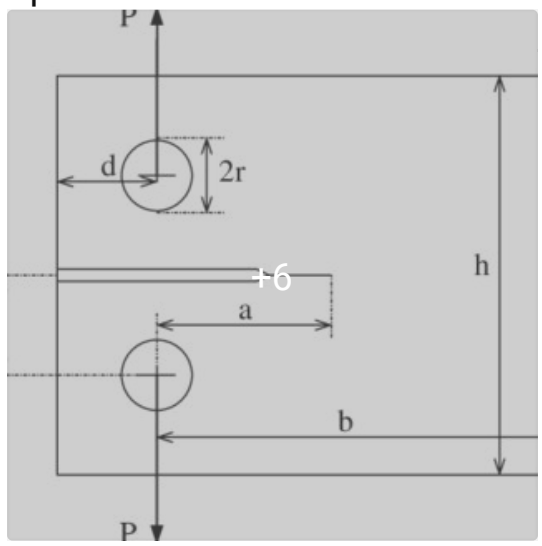
This paper presents a technique for the experimental measurement of stress intensity factors in cracked specimens under mixed-mode loading. This technique is based on full-field measurement using digital image correlation and an interaction integral. Such domain-independent integrals are often used in the finite element method to calculate stress intensity factors. The main advantage of this technique is that the errors made in the estimation of the measured displacement field near the cracks tip do not affect the measurement of the stress intensity factors. The capabilities of the method are illustrated through fracture measurements on compact tension specimens made of maraging steel. Another test under mixed-mode loading is presented.

	R_{min} (mm)	
2.4	3.2	4.0
1.20%		
0.42%	1.16%	
0.17%	0.58%	0.86%
0.27%	0.08%	1.25%
0.12%	0.07%	0.77%





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