# Mixed mode fatigue crack propagation with a cohesive XFEM model

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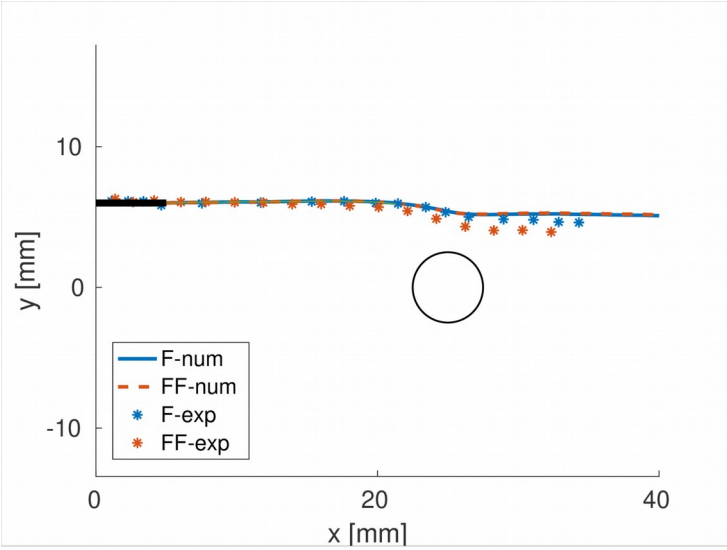
## ABSTRACT

The benchmark case for fatigue crack growth (Langlois et al, 2018) is simulated with a model that is built upon the phantom-node version of the extended finite element method (XFEM), which enables a crack to grow in arbitrary direction independent of the mesh geometry. The model makes a distinction between a physical crack tip and a numerical one. In between the two tips, ahead of the physical tip, a cohesive zone is implemented. The numerical crack tip propagates once the maximum principal stress around the tip exceeds a threshold stress and its direction is defined to be perpendicular to the non-local maximum principal stress. The physical crack tip is pushed forward after every computed cycle. The actual number of cycles required for this crack increment is determined from the energy release rate (ERR) with Paris' equation.




*Preliminary result crack path*