# Impact loading of interface cracks: effects of cracks' closure and friction

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The fracture mechanics problems of dynamic loading of cracked engineering materials are traditionally of interest in academia and industry, as cracks could be the main reason of structures' collapse. Solving any crack problems, the possible contact of the crack faces must be taken into account, as it changes the distribution of the stresses and the displacements in the vicinity of the crack not only quantitatively but also qualitatively. The linear crack between two dissimilar elastic isotropic half-spaces under impact loading is considered. The system of boundary integral equations for displacements and tractions at the interface is derived from the dynamic Somigliana identity in the frequency domain, and the loading is presented by the exponential Fourier series. To take the crack faces' contact interaction into account we assume that the contact satisfies the Signorini constraints and the Coulomb friction law.The problem is solved numerically using the iterative process – the solution changes until the distribution of physical values satisfying the contact constraints is found. The numerical convergence of the method with respect to the number of the Fourier coefficients and mesh size is analysed. The effects of material properties and values of the friction coefficient on the distribution of stress intensity factors (opening and shear modes) are presented and analysed. Special attention is paid to the size of the contact zone and the results are compared with the classical model solutions obtained for the static problems with friction. In the future the approach can be extended to three-dimensional fracture mechanics problems for layered cracked materials under dynamic loading.