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boundary integral method
Calculation of Stress Intensity Factors for 2-D Crack Problem on Laminated Composite Materials
Calculation of Stress Intensity Factors for Cracks in Structural and Mechanical Components Subjected to Complex Stress Fields
Calculation of stress intensity factors using the finite element method
Methodology for Mixed-Mode Stress-Intensity Factor Calculations
Calculation of Stress Intensity Factors for Cracks of Complex Geometry and Subjected to Arbitrary Nonlinear Stress Fields
Calculation of Stress Intensity Factors in an Isotropic Multicracked Plate
Computational and Experimental Simulations in Engineering
Calculation of Stress Intensity Factors in an Isotropic Multicracked Plate. Part 1: Theoretical Development
Stress Intensity Factors Handbook
The computation of stress intensity factors in dissimilar materials using a contour integral method
Stress Intensity Factor Determination for Three-Dimensional Crack Using the Displacement Discontinuity Method with Applications to Hydraulic Fracture Height Growth and Non- Planar Propagation Paths
Stress Intensity Factors and Weight Functions

A Solution Guide
Practical Method for Calculating Stress-Intensity Factors Through Weight Functions
Calculation of Stress Intensity Factors in an Isotropic Multicracked Plate. Part 1
Theory and Application
Computation of the Weight Function from a Stress Intensity Factor
Displacement Discontinuity Method
Proceedings of the International Conference, SIF 2002, Perth, Australia, 25-28
September 2002
Stress Analysis, Crack Propagation and Stress Intensity Factor Computation of a
Ti-6Al-4V Aerospace Bracket Using ANSYS and FRANC3D
Computation of Stress Intensity Factors by the Mode Enrichment Technique with
Applications to Geometrically Nonlinear Problems
Calculation of Stress Intensity Factors for 2-D Crack Problem Using Element Free
Galerkin Method
Numerical Computation of Stress Intensity Factors for Aircraft Structural Details by
the Finite Element Method
Stress-intensity Factor Calculations Using the Boundary Force Method
Encyclopedia of Tribology
Methods of Analysis and Solutions of Crack Problems
Computation of Stress Intensity Factor for Through Cracks in Plates and Bending of

GRAHAM CASSIUS

Computation of Stress Intensity Factors Springer Nature
The existence for a plane or axisymmetric cracked body of an influence or Green's function, depending on the geometry of the body, allows calculation by means of a simple integral of the stress intensity factor. In this way the respective influence of geometry and load in K calculation are separated. The relationship between this function and the compliance for a concentrated force applied on the crack is shown.
Calculation of Stress Intensity Factors for Interface Cracks Under Mixed-Mode Loading Independently Published
It is weH known that the traditional failure criteria cannot adequately explain failures which occur at a nominal stress level considerably lower than the ultimate strength of the material. The current procedure for predicting the safe loads or safe useful life of a structural member has been evolved around the discipline oflinear fracture mechanics. This approach introduces the concept of a crack extension force which can be used to rank materials in some order of fracture resistance. The idea is to determine the largest crack that a material will tolerate without failure. Laboratory methods for characterizing

the fracture toughness of many engineering materials are now available. While these test data are useful for providing some rough guidance in the choice of materials, it is not clear how they could be used in the design of a structure. The understanding of the relationship between laboratory tests and fracture design of structures is, to say the least, deficient. Fracture mechanics is presently at astandstill until the basic problems of scaling from laboratory models to fuH size structures and mixed mode crack propagation are resolved. The answers to these questions require some basic understanding ofthe theory and will not be found by testing more specimens. The current theory of fracture is inadequate for many reasons. First of aH it can only treat idealized problems where the applied load must be directed normal to the crack plane.

Compendium of Stress Intensity Factors
Springer Science & Business Media
This book gathers the latest advances, innovations, and applications in the field of computational engineering, as presented by leading international researchers and engineers at the 24th International Conference on Computational & Experimental Engineering and Sciences (ICCES), held in Tokyo, Japan on March 25-28, 2019. ICCES covers all aspects of applied sciences and engineering: theoretical, analytical, computational, and experimental studies and solutions of problems in the physical, chemical, biological, mechanical, electrical, and

mathematical sciences. As such, the book discusses highly diverse topics, including composites; bioengineering & biomechanics; geotechnical engineering; offshore & arctic engineering; multi-scale & multi-physics fluid engineering; structural integrity & longevity; materials design & simulation; and computer modeling methods in engineering. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.

Structural Integrity and Fracture

CRC Press

This book presents a liber amicorum dedicated to Wolfgang H. Müller, and highlights recent advances in Prof. Müller's major fields of research: continuum mechanics, generalized mechanics, thermodynamics, mechanochemistry, and geomechanics. Over 50 of Prof. Müller's friends and colleagues contributed to this book, which commemorates his 60th birthday and was published in recognition of his outstanding contributions.

A Tribute to Wolfgang H. Müller

Springer

A simple technique was developed using conventional finite element analysis to determine stress intensity factors (K1 and K2) for interface cracks under mixed-mode loading. This technique involves the calculation of crack-tip stresses using nonsingular finite elements. These stresses are then combined and used in a linear regression procedure to calculate K1 and K2. The technique was demonstrated by calculating K1 and K2 for three different bimaterial combinations.

Calculation of the Generalized Stress Intensity Factors for a V-notched Anisotropic Body Createspace Independent Publishing Platform

Many people find the concept of fracture and damage mechanics to be somewhat problematic, mainly because, until recently, close attention in mechanics was focused especially on the strength and resistance of materials. In this sense, to speak of fracture is as uncomfortable for some as it is to speak of a deadly disease. In confronting and preventing a fatal disease, one must understand its complexity, symptoms, and behavior; by the same token, in securing the strength of an engineering structure, one must understand the reasons and type of its potential failure. This book will provide knowledge and insights on this matter to its readers.

New Achievements in Continuum Mechanics and Thermodynamics Wit Pr/Computational Mechanics

Computation of Stress Intensity Factors and Measurements of Residual Stresses in Welded Thin-walled CylindersCalculation of Stress Intensity Factors for Cracks in Structural and Mechanical Components Subjected to Complex Stress Fields

Computation of Stress Intensity Factors for Flawed Bodies with Residual Stresses Computational Mechanics

TRIBOLOGY – the study of friction, wear

and lubrication – impacts almost every aspect of our daily lives. The Springer Encyclopedia of Tribology is an authoritative and comprehensive reference covering all major aspects of the science and engineering of tribology that are relevant to researchers across all engineering industries and related scientific disciplines. This is the first major reference that brings together the science, engineering and technological aspects of tribology of this breadth and scope in a single work. Developed and written by leading experts in the field, the Springer Encyclopedia of Tribology covers the fundamentals as well as advanced applications across material types, different length and time scales, and encompassing various engineering applications and technologies. Exciting new areas such as nanotribology, tribochemistry and biotribology have also been included. As a six-volume set, the Springer Encyclopedia of Tribology comprises 1630 entries written by authoritative experts in each subject area, under the guidance of an international panel of key researchers from academia, national laboratories and industry. With alphabetically-arranged entries, concept diagrams and cross-linking features, this comprehensive work provides easy access to essential information for both researchers and practicing engineers in the fields of engineering (aerospace, automotive, biomedical, chemical, electrical, and mechanical) as well as materials science, physics, and chemistry.
The Life of Cracks Cambridge Scholars

Publishing
An essential part of describing the damage state and predicting the damage growth in a multicracked plate is the accurate calculation of stress intensity factors (SIF's). Here, a methodology and rigorous solution formulation for SIF's of a multicracked plate, with fully interacting cracks, subjected to a far-field arbitrary stress state is presented. The fundamental perturbation problem is derived, and the steps needed to formulate the system of singular integral equations whose solution gives rise to the evaluation of the SIF's are identified. This analytical derivation and numerical solution are obtained by using intelligent application of symbolic computations and automatic FORTRAN generation capabilities (described in the second part of this paper). As a result, a symbolic/FORTRAN package, named SYMFRAC, that is capable of providing accurate SIF's at each crack tip was developed and validated. Binienda, W. K. and Arnold, S. M. and Tan, H. Q. Glenn Research Center NASA-TM-105766, E-7183, NAS 1.15:105766 RTOP 510-01-50...
Part 2: Symbolic/Numeric Implementation Springer Science & Business Media
One of the difficulties in using fracture mechanics is in determining stress intensity factors of cracked structural and mechanical components. The cracks are often subjected to complex stress fields induced by external loads and residual stresses resulting from the surface treatment. Both stress fields are

characterized by non-uniform distributions, and handbook stress intensity factor solutions are seldom available in such cases. The method presented below is based on the generalized weight function technique enabling the stress intensity factors to be calculated for any Mode I loading applied to a planar semi-elliptical surface crack. The stress intensity factor can be determined at any point on the crack tip contour by using the general weight function. The calculation is carried out by integrating the product of the stress field and the weight function over the crack area.

Calculation of Stress Intensity Factors in an Isotropic Multicracked Plate: Part 2: Symbolic/numeric Implementation Computation of Stress Intensity Factors and Measurements of Residual Stresses in Welded Thin-walled CylindersCalculation of Stress Intensity Factors for Cracks in Structural and Mechanical Components Subjected to Complex Stress FieldsOne of the difficulties in using fracture mechanics is in determining stress intensity factors of cracked structural and mechanical components. The cracks are often subjected to complex stress fields induced by external loads and residual stresses resulting from the surface treatment. Both stress fields are characterized by non-uniform distributions, and handbook stress intensity factor solutions are seldom available in such cases. The method presented below is based on the generalized weight function technique enabling the stress intensity factors to be calculated for any Mode I loading applied to a planar semi-elliptical surface crack. The stress intensity factor can be determined at any point on the crack tip contour by using the general weight function. The calculation is carried out by integrating the product of the stress field and the weight function over the crack area.Stress Intensity Factors HandbookComputation of Stress Intensity Factor for Through Cracks in Plates and Bending of Shells Using P-version Finite Element MethodComputation of Stress Intensity FactorsThe performance characteristics of the generalized influence function method for the approximate computation of the amplitudes of the eigenfunctions of the equations of plane elasticity in the vicinity of sharp reentrant corners were evaluated. The eigenfunctions satisfy the equations of equilibrium, compatibility and stress-strain laws and the free-free boundary conditions at reentrant corners. The amplitudes of the eigenfunctions are called the generalized stress intensity factors. It is concluded that the generalized stress intensity factors can be computed to within one percent relative error with small computational effort. Therefore the essential characteristics of the elastic stress field in the neighborhood of reentrant corners can be determined with great precision. This computational technology is essential for the development of theories of crack initiation in metals and composites. Additional keywords:

fracture(mechanics); eigenvalues; linearity. (Author).Stress Intensity Factors and Weight Functions
Topics covered in this title include: the fracturing and damage of composite materials; ceramics; metals; and concretes and rocks at different scales in both monotonic and cyclic loading.

On the computation of stress intensity factors in fibre composite media using a boundary integral method Springer
Stress intensity factor determination plays a central role in linearly elastic fracture mechanics (LEFM) problems. Fracture propagation is controlled by the stress field near the crack tip. Because this stress field is asymptotic dominant or singular, it is characterized by the stress intensity factor (SIF). Since many rock types show brittle elastic behaviour under hydrocarbon reservoir conditions, LEFM can be satisfactorily used for studying hydraulic fracture development. The purpose of this paper is to describe a numerical method to evaluate the stress intensity factor in Mode I, II and III at the tip of an arbitrarily-shaped, embedded cracks. The stress intensity factor is evaluated directly based on displacement discontinuities (DD) using a three-dimensional displacement discontinuity, boundary element method based on the equations of proposed in [1]. The boundary element formulation incorporates the fundamental closed-form analytical solution to a rectangular discontinuity in a homogenous, isotropic and linearly elastic half space. The

accuracy of the stress intensity factor calculation is satisfactorily examined for rectangular, penny-shaped and elliptical planar cracks. Accurate and fast evaluation of the stress intensity factor for planar cracks shows the proposed procedure is robust for SIF calculation and crack propagation purposes. The empirical constant proposed by [2] relating crack tip element displacement discontinuity and SIF values provides surprisingly accurate results for planar cracks with limited numbers of constant DD elements. Using the described numerical model, we study how fracturing from misaligned horizontal wellbores might results in non-uniform height growth of the hydraulic fracture by evaluating of SIF distribution along the upper front of the fracture.

Calculation of Stress Intensity Factors for 2-D Crack Problem on Laminated Composite Materials

The performance characteristics of the generalized influence function method for the approximate computation of the amplitudes of the eigenfunctions of the equations of plane elasticity in the vicinity of sharp reentrant corners were evaluated. The eigenfunctions satisfy the equations of equilibrium, compatibility and stress-strain laws and the free-free boundary conditions at reentrant corners. The amplitudes of the eigenfunctions are called the generalized stress intensity factors. It is concluded that the generalized stress intensity factors can be computed to within one percent relative error with small computational effort. Therefore the essential characteristics of the elastic stress field in the neighborhood of reentrant corners can be determined with great precision. This computational technology is essential for the development of theories of crack initiation in metals and composites. Additional keywords: fracture(mechanics); eigenvalues; linearity. (Author).

Calculation of Stress Intensity Factors for Cracks in Structural and Mechanical Components Subjected to Complex Stress Fields

To predict crack growth and fracture strengths of riveted joints subjected to widespread fatigue damage, accurate stress and fracture analyses of corner and surface cracks at a rivet hole are needed. The results presented in this report focus on the computation of stress-intensity factor solutions for rivet holes with cracks. The stress-intensity factor solutions for surface and corner cracks at countersunk rivet holes in a plate were obtained using the finite-element-alternating technique. A range of crack shapes, crack sizes, and crack locations under remote tension were considered.

Calculation of stress intensity factors using the finite element method

Analytical derivations of stress intensity factors (SIF's) of a multicracked plate can be complex and tedious. Recent advances, however, in intelligent application of symbolic computation can overcome these difficulties and provide the means to rigorously and efficiently analyze this class of problems. Here, the symbolic algorithm required to implement the methodology described in Part 1 is presented. The special problem-oriented symbolic functions to derive the fundamental kernels are described, and the associated automatically generated FORTRAN subroutines are given. As a result, a symbolic/FORTRAN package named SYMFRAC, capable of providing accurate SIF's at each crack tip, was developed and validated. Simple illustrative examples using SYMFRAC show the potential of the present approach for predicting the macrocrack propagation path due to existing microcracks in the vicinity of a macrocrack tip, when the influence of the microcrack's location, orientation, size, and interaction are taken into account. Arnold, S. M. and Binienda, W. K. and Tan, H. Q. and Xu, M. H. Glenn Research Center RTOP 510-01-50...

Methodology for Mixed-Mode Stress-Intensity Factor Calculations

On Fracture Mechanics A major objective of engineering design is the determination of the geometry and dimensions of machine or structural elements and the selection of material in such a way that the elements perform their operating function in an efficient, safe and economic manner. For this reason the results of stress analysis are coupled with an appropriate failure criterion. Traditional failure criteria based on maximum stress, strain or energy density cannot adequately explain many structural failures that occurred at stress levels considerably lower than the ultimate strength of the material. On the other hand, experiments performed by Griffith in 1921 on glass fibers led to the conclusion that the strength of real materials is much smaller, typically by two orders of magnitude, than the theoretical strength. The discipline of fracture mechanics has been created in an effort to explain these phenomena. It is based on the realistic assumption that all materials contain crack-like defects from which failure initiates. Defects can exist in a material due to its composition, as second-phase particles, debonds in composites, etc. , they can be introduced into a structure during fabrication, as welds, or can be created during the service life of a component like fatigue, environment-assisted or creep cracks. Fracture mechanics studies the loading-bearing capacity of structures in the presence of initial defects. A dominant crack is usually assumed to exist.

Calculation of Stress Intensity Factors for Cracks of Complex Geometry and Subjected to Arbitrary Nonlinear Stress Fields

A method is presented for the calculation of mixed-mode stress-intensity factors for three dimensional crack fronts. The method uses the nodal forces for the calculation. The strength of this approach is the accuracy of nodal force calculations and the avoidance of the assumption of plane strain. The methodology is described for general crack fronts. The special case of a straight crack front is presented in detail. An example problem is solved with a reference solution. The results of the present method agree to within 3% of the reference value.

Calculation of Stress Intensity Factors in an Isotropic Multicracked Plate

A robust method for calculating a generalized stress intensity factor for a V-notched anisotropic body under symmetric and/or anti-symmetric deformation is derived for plane stress or plane strain. The compact formulation for the generalized stress intensity factors is derived based on Stroh formalism. A path-independent line integral together with an auxiliary field solution, called the interaction M-integral, is utilized to solve for these generalized stress intensity factors. Through numeric evaluation of the interaction M-integral using a finite element solution, the generalized stress intensity factors can be found. These generalized stress intensity factors can be used to predict the failure conditions without the need for a detailed notch-tip field solution. Since the interaction M-integral is path-independent, the calculation can be carried out in the region away from the notch tip where a conventional finite element solution is sufficient to perform this analysis. Numeric results for the generalized stress intensity factors are given for a thin rectangular plate with double edge notches. The specimen geometry used follows that in the ASTM standard D 5379/D 5379M-93 for shear property testing of fiber-reinforced composite materials. The method is first verified for three example problems. Then, the generalized stress intensity factors are given for a wide range of notch depths and angles for isotropic and anisotropic material property cases. Two in-plane fiber orientations of a unidirectional fiber-reinforced graphite/epoxy composite are considered. Two loading cases are given to produce symmetric and anti-symmetric deformation. The generalized stress intensity factor results given here for anti-symmetric deformation are unprecedented.

Computational and Experimental Simulations in Engineering

The results of a program of research involving application of the hybrid finite element method to fracture mechanics analyses of several typical aircraft structural details are presented. The performance properties of the specialized finite element building blocks are reviewed. Capabilities of the computer analysis codes are discussed with regard to valid parameter ranges, core storage requirements and execution times. Numerical results obtained from extended parameter studies are presented in the form of handbook charts. Suggestions are offered for future improvements and comments are made about the limits of applicability of the data base to airframe damage tolerance analysis.

Calculation of Stress Intensity Factors in an Isotropic Multicracked Plate. Part 1: Theoretical Development

Fatigue cracks in shot-peened and case-hardened notched machine components are subjected to stress fields induced by the external load and residual stresses resulting from the surface treatment. Both stress fields are characterized by nonuniform distributions, and handbook stress intensity factor solutions are in such cases unavailable, especially in the case of planar nonelliptical cracks. The method presented here is based on the generalized weight function technique enabling the stress intensity factors to be calculated for any Mode I loading applied to arbitrary planar convex and embedded crack. The stress intensity factor can be determined at any point on the crack contour by using one general weight function discussed in the paper. The weight function, mA, can be sufficiently well described by two quantities, i.e., the distance, ?, from the load point, P(x, y), on the crack surface to the point, A, on the crack front where the stress intensity is to be calculated and the length, ?c, of the inverted crack contour. The stress intensity factors are calculated by integrating the product of the stress field and the weight function over the entire crack area.

- Adult Children Of Emotionally Immature Parents: How To Heal From Distant, Rejecting, Or Self-involved Parents By Lindsay C. Gibson Psyd
- Outlive: The Science And Art Of Longevity
- Lord Of The Flies
- Twisted Lies (twisted, 4) By Ana Huang
- Think And Grow Rich: The Landmark Bestseller Now Revised And Updated For The 21st Century (think And Grow Rich Series)
- The Summer Of Broken Rules By K. L. Walther