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SYSTEM OF CRACKS IN THE SKIN OF THE SPACECRAFT

**Abstract**

Space structures can experience planned and accidental outer loads, which affect their safety. A large number of cracks occur during the combustion of solid fuels. Failure to control crack propagation can lead to serious consequences. Any material contains defects that affect possible destruction. It should be borne in mind that under load, both new microdefects can appear in the objects under study, and existing ones can develop. In practice, there are a lot of defects of various scales in real material. One of the main tasks of fracture mechanics is to describe the behavior of media with cracks. At the same time, more and more attention is paid to the study of large systems, including periodic structures. For several cracks, the influence factor is considered to be an important parameter. It is the ratio of the stress intensity factor found for the problem of a system of cracks to the stress intensity factor for a single crack found under the same loading. The paper proposes a technique that allows to accurately determine the coefficients of influence for large systems of cracks, including in the case of periodic structures, in which the number of cracks is infinite. The method is based on a numerical algorithm developed by the authors that uses the method of discontinuous displacements of a high order of accuracy and an asymptotic representation of stress fields at the crack tip (M. Williams). To verify the method, the results of the implemented algorithm are compared with known analytical solutions both for single cracks and for an infinite doubly periodic system of cracks.