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Stress Distribution in Axisymmetric Indentation of an Elastic Layer-Substrate Body

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Abstract : We focus on internal stress and displacement of an elastic axisymmetric contact problem for indentation of a layer-substrate body. An elastic layer is assumed to be perfectly bonded to an elastic semi-infinite substrate. The elastic layer is smoothly indented with a flat-ended cylindrical indenter. The analytical and exact solutions were obtained by solving an infinite system of simultaneous equations using the method to express a normal contact stress at the upper surface of the elastic layer as an appropriate series. This paper presented the numerical results of internal stress and displacement distributions for hard-coating system with constant values of Poisson’s ratio and the thickness of elastic layer.

Keywords : indentation, contact problem, stress distribution, coating materials, layer-substrate body
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