SM2L_10415

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Electric-Mechanical Beam-To-Beam Contact

Daniela P. Boso[(1)], Przemyslaw Litewka[(2)], Bernhard A. Schrefler[(1)], Peter Wriggers[(3)]

(1) *University of Padua, Padova, Italy*
(2) *Poznań University of Technology, Poznań, Poland*
(3) *University of Hanover, Hanover, Germany*

In this paper the formulation of an electric-mechanical beam-to-beam contact element is presented. Beams with circular cross-sections are assumed to get in contact in a point-wise manner and with clean metallic surfaces. The voltage distribution is influenced by the contact mechanics, since the current flow is constricted through small contacting spots. Therefore the solution is governed by the contacting areas and hence by the contact forces. As a consequence the problem is semi-coupled with the mechanical field influencing the electric one. The electric-mechanical contact constraints are enforced with the penalty method within the Finite Element technique. The virtual work equations for the mechanical and electric fields are written and consistently linearized to achieve a good level of computational efficiency with the FE method. The equations set is solved with a monolithic approach.

View the extended summary