

STRESS INTENSITY FACTOR, ENERGY DISTRIBUTION AND FORCES ACTING ON CRACK IN PIEZOELECTRIC ROBOTS' SENSORS

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Abstract: *This article presents numerical results for the issue of crack in piezoelectric sensor applied in robotics. Normalized force, normalized energy and stress intensity factor are analyzed for crack opening in mode I in the single material and between two materials. The linear elastic fracture mechanics is used in the analysis. Force and energy distribution around crack in piezoelectric PZT ceramic (PZT-4 and PZT-6B) are calculated in the result section and interpreted in conclusion. Safety intensity factor is calculated for mode I case. Importance of such analysis is in ability of robot to perform its task with smaller risk of failure. Failure due to sensor malfunction can endanger not just the task, but also the people in the proximity of robot manipulation area. Sensor's failure can cause disability to avoid obstacles or to cause injuries (in the worst case with mortal consequences).*

Key words: *safety factor, piezoelectric material, crack, force, linear elastic fracture mechanics, PZT ceramic*



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