

C315767 : MAJOR MECHANICAL ENGINEERING

KEYWORD: MATHEMATICAL MODEL/ FLEXIBLE MANIPULATOR ARM/ CONTROL

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MANIPULATOR ARM FOR CONTROL APPLICATIONS. THESIS ADVISOR ASST.
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The assumed mode shape and Lagrange's equations were used for obtaining the mathematical model of a flexible manipulator arm. The first two modes of vibration were considered here, so that 6-state variables mathematical model were verified with experiments. The measurement of strain values were used for evaluating generalized coordinates ($q(t)$). So the deflection of the manipulator arm ($u(x,t)$) as the arm is moving was the summation of the mode shapes $\phi(x)$ and generalized coordinates.

The manipulator arm was swung at specified mode shape. The experimental and the theoretical results were compared. The deflection was calibrated by using static test method. From the experiment, it can be shown that the generalized coordinates obtained with this method are accurate enough for the feedback control purpose.