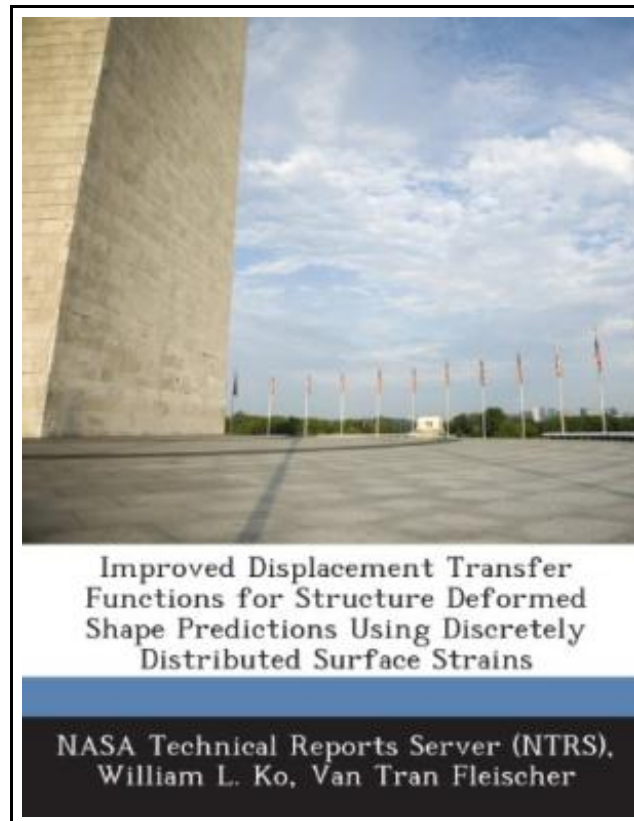


## Improved Displacement Transfer Functions for Structure Deformed Shape Predictions Using Discretely Distributed Surface Strains



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## IMPROVED DISPLACEMENT TRANSFER FUNCTIONS FOR STRUCTURE DEFORMED SHAPE PREDICTIONS USING DISCRETELY DISTRIBUTED SURFACE STRAINS



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Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.In the formulations of earlier Displacement Transfer Functions for structure shape predictions, the surface strain distributions, along a strain-sensing line, were represented with piecewise linear functions. To improve the shape-prediction accuracies, Improved Displacement Transfer Functions were formulated using piecewise nonlinear strain representations. Through discretization of an embedded beam (depth-wise cross section of a structure along a strain-sensing line) into multiple small domains, piecewise nonlinear functions were used to describe the surface strain distributions along the discretized embedded beam. Such piecewise approach enabled the piecewise integrations of the embedded beam curvature equations to yield slope and deflection equations in recursive forms. The resulting Improved Displacement Transfer Functions, written in summation forms, were expressed in terms of beam geometrical parameters and surface strains along the strain-sensing line. By feeding the surface strains into the Improved Displacement Transfer Functions, structural deflections could be calculated at multiple points for mapping out the overall structural deformed shapes for visual display. The shape-prediction accuracies of the Improved Displacement Transfer Functions were then examined in view of finite-element-calculated deflections using different tapered cantilever tubular beams. It was found that by using the piecewise nonlinear strain representations, the shape-prediction accuracies could be greatly improved, especially for highly-tapered cantilever tubular beams.



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