Table 3 Errors of frequencies and static deflection for carbon fabric composite $[0]_{8T}$

Mode	Test, Hz	FDUB,[a] Hz	Error, %	FDUP,[b] Hz	Error, %
1	66.25	72.3	9.1	66.28	0.038
2	130	127.8	−1.7	129.8	−0.15
3	416.3	452.9	8.8	415.3	−0.25
4	518.8	539.2	3.9	520.0	0.25
5	990	1065.6	7.6	982.3	−0.7
Static deflection, mm	−0.68	−0.61	10.3	−0.677	−0.034

[a]Frequencies and deflection using baseline material properties.
[b]Frequencies and deflection using prediction material properties.

the static deflection errors during the evolution process. Table 3 shows the results of the natural frequencies and static deflection obtained using the finite element method based on the identified material properties. Examination of the error between the experimental data and the numerical data reveal noticeable improvement in accuracy of the present procedure from results based on the baseline material properties.

V. Conclusions

An effective nondestructive procedure for the identification of material properties of composite structures was presented. The combined method using neural networks and an evolution algorithm effectively identifies the material properties. The neural network plays the role of recognizing the input/output patterns and predicting an accurate estimate of the actual material properties, and the evolution algorithm plays the role of providing the neural network with qualified training patterns to enhance the performance of the neural network while reducing the computational costs. The proposed procedure is computationally economic and simple to implement compared with other sensitivity-based schemes because the approach does not require the computation of the sensitivity coefficients. Numerical and experimental studies were made for the assessment of the accuracy and effectiveness of the proposed procedure. Reanalysis results using the finite element method based on the identified material properties were compared with the experimental results. Based on the numerical and experimental studies conducted herein, it can be concluded that more accurate dynamic and static responses of structures can be evaluated by numerical analysis using the material properties identified by the proposed procedure.

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E. R. Johnson
Associate Editor

Errata

Linear Instability of Laterally Strained Constant Pressure Boundary-Layer Flows

P. K. Tyagi and J. Dey
Indian Institute of Science, Bangalore 560 012, India

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WHILE studying the nonparallel aspect of this problem (Tyagi, P. K., "Linear Instability of Laterally Strained Constant Pressure Boundary Layer," M.Sc. Thesis, Dept. of Aerospace Engineering, Indian Inst. of Science, Bangalore, India, 2001), we came across an error in our recently reported result, which was based on the parallel flow approximation. We sincerely regret such an unintentional error.

The nonparallel linear instability equation is found to be the same as that for the Blasius flow. The momentum equation (6) in our earlier analysis shows that, compared to two-dimensional flows, the Reynolds number is changed by the nondimensional divergence/convergence factor, $A/(A + x)$; this factor is <1 and >1 for diverging and converging flows, respectively. Therefore, the linear instability of a constant pressure diverging/converging flow will correspond to that for the Blasius flow at a correspondingly reduced/increased Reynolds number. That is, a diverging flow will be more unstable than the two-dimensional Blasius flow. Similarly, a converging flow will be more stable than the two-dimensional Blasius flow.