Readers' Forum

Brief discussion of previous investigations in the aerospace sciences and technical comments on papers published in the AIAA Journal *are presented in this special department. Entries must be restricted to a maximum of 1000 words, or the equivalent of one* Journal *page including formulas and figures. A discussion will be published as quickly as possible after receipt of the manuscript. Neither the AIAA nor its editors are responsible for the opinions expressed by the correspondents. Authors will be invited to reply promptly.*

Comment on "Structural Damage Detection by Generic Algorithms"

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IN a recent interesting paper,[1] Moslem and Nafaspour describe generic algorithms for the detection of structural damage. However, it is not clear from the paper[1] how the analytical and measured

mode shapes have been normalized. It seems that a proper normalization and an optimal orthogonalization[2,3] of the measured mode shapes can improve the proposed algorithms.

In the paper[1] it is assumed that the mass matrix does not change. This means that the reference basis of the proposed method is the mass matrix. However, this assumption has a much deeper meaning. One can find a theoretical proof[4] that the mass and stiffness matrices cannot be identified simultaneously by using only modal data. In this case, there exists an infinite number of solutions, and by using only modal data, one would pick one of these infinite number of solutions.

References

[1]Moslem, K., and Nafaspour, R., "Structural Damage Detection by Generic Algorithms," *AIAA Journal*, Vol. 40, No. 7, 2002, pp. 1395–1401.

[2]Baruch, M., and Bar-Itzhack, I. Y., "Optimal Weighted Orthogonalization of Measured Modes," *AIAA Journal*, Vol. 16, No. 4, 1978, pp. 346–351.

[3]Baruch, M., "Orthogonalization of Measured Modes—Revisited," *AIAA Journal*, Vol. 35, No. 4, 1997, pp. 744, 745.

[4]Baruch, M., "Modal Data Are Insufficient for Identification of Both Mass and Stiffness Matrices," *AIAA Journal*, Vol. 35, No. 11, 1997, pp. 1797, 1798.

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