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Title: Structural Analysis by Combination of TPA and Modal Analysis

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Abstract:

Noise and vibration in general are often a property of the whole system. Depending on the type of object under investigation, the boundary conditions and the focused frequency range, the causes of vibration or noise problems are predominantly in the excitation mechanism, structural dynamics or both.

The well known *in-situ* TPA provides methods to separate different components of an acoustical system such as source and receiver. The source including excitation and structural dynamics of the exciting subsystem can be described independently of the structural dynamics of the receiving structure by means of the *in-situ* blocked forces. The Modal Analysis is a common method as well and aims on identifying the structural dynamics in terms of mode shapes and damping values of a structure.

This paper addresses the combination of both methods using the example of an e-drive of an electric car, which has been analyzed on a test rig. The correlation of the results of both the methods can be used to gain important insights regarding the source-description and the interaction with the system. The evaluation of path contributions, *in-situ* blocked forces and mode shapes yields in a better understanding of the system and its dependencies.

Thus, this paper demonstrates how to use synergies and get the most out of state-of-the-art methods in the field of structural analysis, using a real live engineering problem.