quency will scale somewhat more favorably than $1/L$. This simplified apprasisal must, of course, be modified by system considerations and trade-offs.

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Comment on "Response of Nonlinear Flat Panel to Periodic and Randomly Varying Loadings"

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Lin[1] presents an interesting analysis of the dynamic response of a flat plate when the nonlinear effects of the membrane forces are significant. Unfortunately, the author has neglected to reference several previous publications presenting results pertinent to this problem, some of which are listed here.[2] Also, the author's treatment of the random-excitation case deserves some comment.

The equivalent linearization technique used seems to be of questionable value in this case, since an exact solution for the mean-square response (as well as other statistical measures) of the randomly excited cubic system is available.[3, 4] It is true that the exact solution is limited to the case of white-noise excitation; however, the limitations of the equivalent linearization method imply much the same restriction.[5] That is, the "true" linear frequency and the equivalent linear frequency cannot be far separated, and the spectrum of the excitation normally may be considered constant over this restricted frequency range. In any case, it is not clear from the article why the author feels that the results of this approximate technique are valid for the case of nonwhite excitation.

The statements concerning the "effective transfer function" also may be questioned. Not all people who are working on the problem of nonlinear panel response would agree that physical occurrence of the upper branch of the nonlinear response curve is as unusual as the author implies.[6] Certainly, if the response of a panel does lie on the upper branch, the effect of damping may not be considered unimportant.

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Author's Reply to Comment by R. J. Herzberg

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Herzberg has listed several recent papers that the author is accused of having neglected in Ref. 1. However, the present author regrets that Herzberg has overlooked the fact that, except for Ref. 2, the other additional references were not available at the time Ref. 1 was submitted for publication. Moreover, the author had no desire to compile a complete bibliography. For example, on the method of equivalent linearization, reference was made to the work by Caughey, which generally is recognized to be one of the earliest, without tracing back to the original idea of Kryloff and Bogolinoff.

The author disagrees with Herzberg that equivalent linearization implies the same restriction as required in the "exact" solution, which, incidentally, may be traced to the work of Kramers in 1940. He also disagrees that the equivalent linearization technique is of little value. The assumption of white-noise excitation is a very strong one and is, strictly speaking, physically unrealistic. Nevertheless, this strong assumption is the basis for treating the response of a mechanical system as a Markoff random vector process in the phase plane. Thus the mathematically exact solution is founded on a physical idealization of an extreme nature. Even when the excitation is a *truncated* white noise, this solution is at best an approximation, since there will be no justification to regard the response as Markoffian.

In Ref. 1 a trial-and-error procedure was suggested so that the method of equivalent linearization might be applied to excitations of varying power spectra. The convergence of this procedure requires only that the forcing power spectra be varying slowly in the frequency range of interest, which is considerably less restrictive than requiring the excitation to be strictly white.

One must not forget that, unless the excitation is strictly white, a truly exact solution for the nonlinear response is not known at the present time. Therefore, it seems strange that Herzberg questions the validity of the linearization method but accepts the so-called exact solution under a condition on which the solution is not based. In contrast, the author believes that the two methods help to substantiate one another when a more realistic excitation is considered.

Unfortunately, the question concerning the effective transfer function also is misunderstood. The author clearly stated in Ref. 1 that the upper branch response *can* be produced under controlled experiment; namely, by gradually sweeping the excitation frequency, as was reported in Ref. 5. However, if the frequency of excitation is *fixed*, then the response of the lowest energy level should prevail.

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