above the range to be corrected. The lowest frequencies of **142** (7e), however, are much too low for the series solution of 7e ("f_r" assumed zero) to have a useful range of convergence.

In any case, extensions to the original form of equation 1 involve the addition of more terms for derivatives of some of the other orders of the variable six-vectors. These are generally of relatively low order, as term significance drops off rapidly with increasing order for the frequencies of interest. Series related terms need usually include only the base member, and the highest order terms arising in a model may be too small to need inclusion.

When empirical calibration is used to determine the coefficients of equation 1, in original or extended form, best fit coefficients will be found given the terms available, regardless of what model or expectations motivated the inclusion of such terms. Thus equation 7f and equation 8d provide somewhat different physical interpretations for the coefficient of the second derivative of the uncorrected force six-vector. Progressively more detailed models would provide progressively more elaborate and accurate interpretations. Careful spring and mass measurements, taken from progressively finer dissections of the system of FIG. **1**, could in principle be used to calculate this progression of coefficients. Each such matrix in turn would have a somewhat different numerical value, but converging rather rapidly toward the single "true" value for the second order coefficient. Yet this latter is just the value found—given that the coefficients of other necessary terms are also being evaluated—by the empirical, in situ calibration method hereinbefore described. Determination of what other terms are necessary may be approached theoretically, as has been seen. It may also be approached experimentally, by the simple expedient of trying forms of equation 1 with differing sets of derivative orders present, to see what works best for the class of mechanical system relevant to a particular application. It should be noted that omitting an unneeded term of lower order may be as important as including a necessary term of higher order, as ambiguities of solution can otherwise exist which preclude the convenience of a calibration in which the unknown forces applied to the excited system may all be zero.

Finally, in the preferred embodiment of the invention, evaluation of the correction terms in equation 1 is subject to known inaccuracies: a slight high frequency roll-up in the accelerometer channels reflecting their twenty three Hz resonance; the variations in the filtering components of the circuits **91** (FIG. **4**); and the use of the second central difference for the second derivative. Each of these is a source of almost two percent error in the corrections. (Since these errors are independent, their combined expected value is around three percent, consistent with the before mentioned factor of thirty improvement attained.) Embodiments seeking improvement of correction for this application thus begin with improving the accuracy with which the present correction terms are evaluated, rather than by adding new terms to equation 1.

Therefore, in an alternative embodiment, sampling frequency may be increased, the accelerometer resonant frequency may be increased, and the two output capacitors of each circuit **91**, preferably all in similar ratio, may be decreased. These changes improve the accuracy with which the correction terms of original equation 1 are evaluated, thereby further improving overall system rejection of inertial interference.

In still another embodiment, timing circuit signal **84** in the circuit of FIG. **4** is forced to a somewhat different amplitude by factory test apparatus, and the step responses of circuits **94** monitored, such that correcting inverse responses may be convolved into the filters **60** of FIG. **5**. A correcting inverse over the frequency range of interest (up to about ten Hz) for the accelerometer resonance is likewise convolved into the accelerometer channel filters of **60**. The filters of **60** thus modified are convolved into the filters of **61**. The second derivative approximation may be expanded to a five tap filter. The linearity of operations is exploited to change the order of differentiation and matrix multiplication, so that the second derivative filter may be convolved into a copy of the eight force responsive filters of **61**, as modified. Related matching delays may also be added to the other channels, and two copies of transformation **60** must be executed to provide both signal **71** and signal **72** of FIG. **5**. Each of the resultant filters **61** is then shortened in group delay by truncating the (very small) lead coefficient. In this manner, correction accuracy is improved.

In either of these last embodiments, the low-pass cutoff frequency of filters **61** may be raised, allowing lower group delay. In this manner, improved correction may be exploited to provide faster system response.

While the invention as applied to the touch-input computer and related CRT or similar displays employing touch force location measurement techniques has been illustratively described, preferably embodying each of the novel accelerometer, derivative correction and calibration techniques of the invention, there are instances where the combination of all such techniques may not be required for inertial interference suppression, as before mentioned. Concerning the independence of the accelerometer and derivative connection techniques, there are touch screen systems such as some monitor or desktop systems without control of the support surface where only the accelero-meter-based correction may be most useful. For a general purpose retrofit unit, on the other hand, a major problem resides in large or softly mounted monitors. Such units would benefit from the derivative-based correction only, at least for users with a reasonably solid desk or table. The novel calibration procedure is also more generally useful.

From another approach or viewpoint, a feature of the invention resides in its novel form of an effective linear filtering, at least as applied to force measurement. While, as earlier discussed, simple forms of so-called linear filtering have been proposed in other types of applications, such, unlike the present invention, generally attenuate all energy near the frequencies of distortion, rather than correcting the distortion. The present invention, as previously explained, quite to the contrary, attenuates the error of the signal but not the signal itself, even right at the frequencies of maximum error.

Conventional filtering, moreover, involves blocking frequencies in some range as strongly as possible, while passing others unaffected, and does so over a broad range of roughly similar installations. The method of the present invention, however, requires and involves the generation of calibration data that reflects the detailed quantitive characteristics of the supported mass and associated particular mechanical system of the specific installation.

A further striking difference underlying the invention is that it requires the output or outputs to have generally differing "filter" characteristics with respect to each of the multiple inputs, determined by the specific mechanical system characteristics. Only in quite rare instances might two be the same, as previously pointed out.

The novelty of the calibration procedure itself also appears to reside in several universal aspects. First, there is