vector generation process using an effective directional modal mass representation of 90% to 95% of the corresponding total mass in the three orthogonal directions, was able to provide an adequate number of vectors to obtain a satisfactory convergence of the response quantities of interests, with relative error of the order of 10% to 5% when compared to "exact" solutions.

8 Conclusion

A new algorithm to generate load dependent Ritz transformation vectors which tend to have a high participation to the structural response, and can include directly the effect of static correction in the basis has been presented along with an error norm to measure the earthquake loading representation achieved by truncated vectors bases. Actual numerical experimentations have shown that for seismic analyses, load dependent Ritz solutions have definite advantages over exact eigensolutions in terms of a much reduced numerical effort to generate the transformation vectors, and improved convergence rate of the resulting bases in terms of the response quantities of interests.

Traditionally the accuracy of the eigensolution, obtained at a high computational costs, has been a primary criterion for the analyst to accept a vector basis for coordinate transformation. It was however shown that a criterion based on the representation of the earthquake load by the vector basis was actually sufficient to ensure a satisfactory solution for seismic analyses based on the response spectra method and that the accuracy of the eigensolution might be considered of secondary importance. The long execution time of the subspace iteration is thus hardly justifiable for this type of analysis where a fixed load distribution has been specified.

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