



Université Lille Nord de France
Pôle de Recherche
et d'Enseignement Supérieur

Ecole doctorale régionale Sciences Pour l'Ingénieur Lille Nord-de-France - 072



Title: Analysis and numerical simulation of structure vibration for high frequencies.

Financement prévu : Bourse MNRT

Cofinancement éventuel :

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Laboratory : Unité Lilloise de Mécanique

Equipe : Interaction Fluide Structure

Topic Description:

Classical numerical methods, Finite Elements and Modal analysis are suitable for vibrational analysis of structure with low and mid frequencies. These methods are commonly used in Civil engineering, and automotive industry, for sound reduction and acoustic comfort.

For high frequency analysis, these classical methods cannot be used due to the small size of the wavelength in the model, small with respect to the dimension of the structure involved in the model. For numerical accuracy few elements per wavelength need to be used. This condition leads to a very fine mesh with a very large number of elements and thus a prohibited computational time.

To solve vibration problems for high frequency analysis, a statistical approach has been developed based on wave propagation in structures.

For high frequency analysis, Statistical energy analysis (SEA) has proved to be a promising approach to the calculation of sound transmission in complex structures. In automotive industry and civil engineering, new structures for noise absorption need to be developed for acoustic comfort.

This fully funded position is available for an outstanding motivated master student interested in pursuing Ph.D. studies in developing in an existing code new features for sound absorbing structures.