

Honors theses

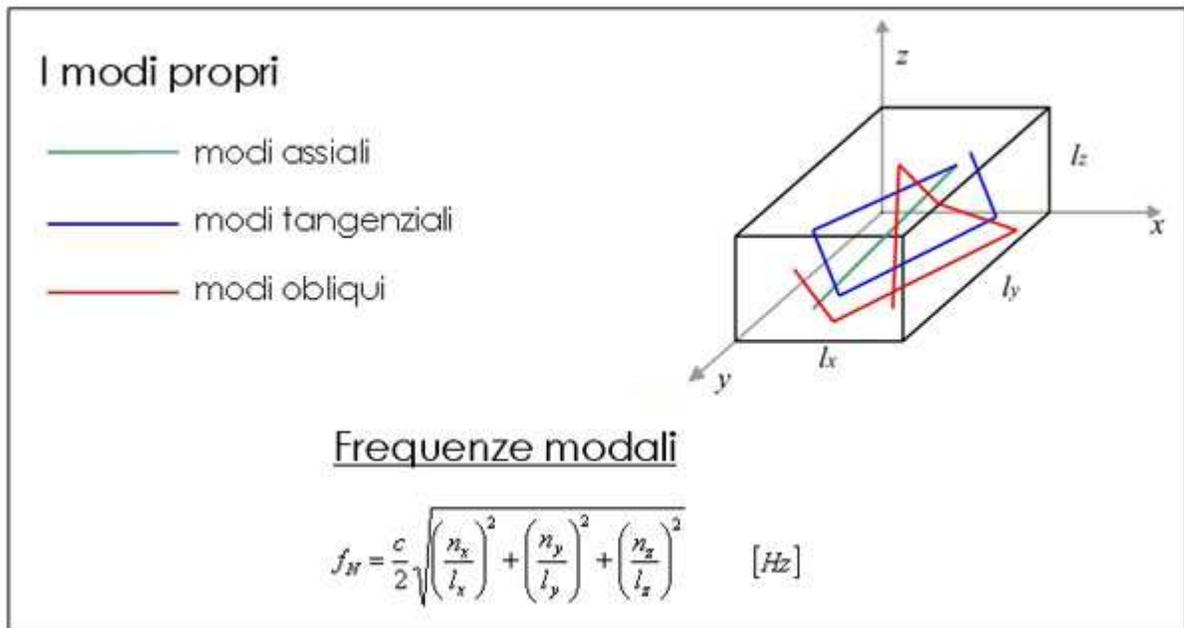
The acoustic design of small rooms: the classrooms for the studying of music in the conservatories

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To make a careful design of a music classroom is important to know the peculiarities of each instrument played and to deliver a subjective survey among students and teachers to find the imperfections of the room. It is also important to make technical measurements in the building to understand the acoustic quality of all its spaces. Each of these aspects is reported in the thesis, before in a generic way to understand and define how design small rooms for music, and after put the achieved information in practice, using a classroom of the *Giuseppe Verdi* Conservatory of Turin. Therefore, the thesis is made in two parts.

The first theoretical section shows the needs of small spaces used by one musician or by a small group. Since the students and the teachers are the users of these rooms, it is fundamental listening to their needs and their critics, to understand which parameter is the most important for them during the performance. In fact, they have subjective acoustical parameters that can result not important to a listener. Each room has its own modal frequencies and if the sound played has the same frequencies, then it becomes more intense and for the musician is hard to play in this condition.



Acoustic modes and modal frequencies of a room

For this reason the design of these rooms should avoid the presence of every kind of disturb. The shape of the rooms, the materials used, the instruments played arrange a different sound quality according to the selections. Therefore is fundamental be acquainted to the acoustic consequences that came from the different architectonic decisions.

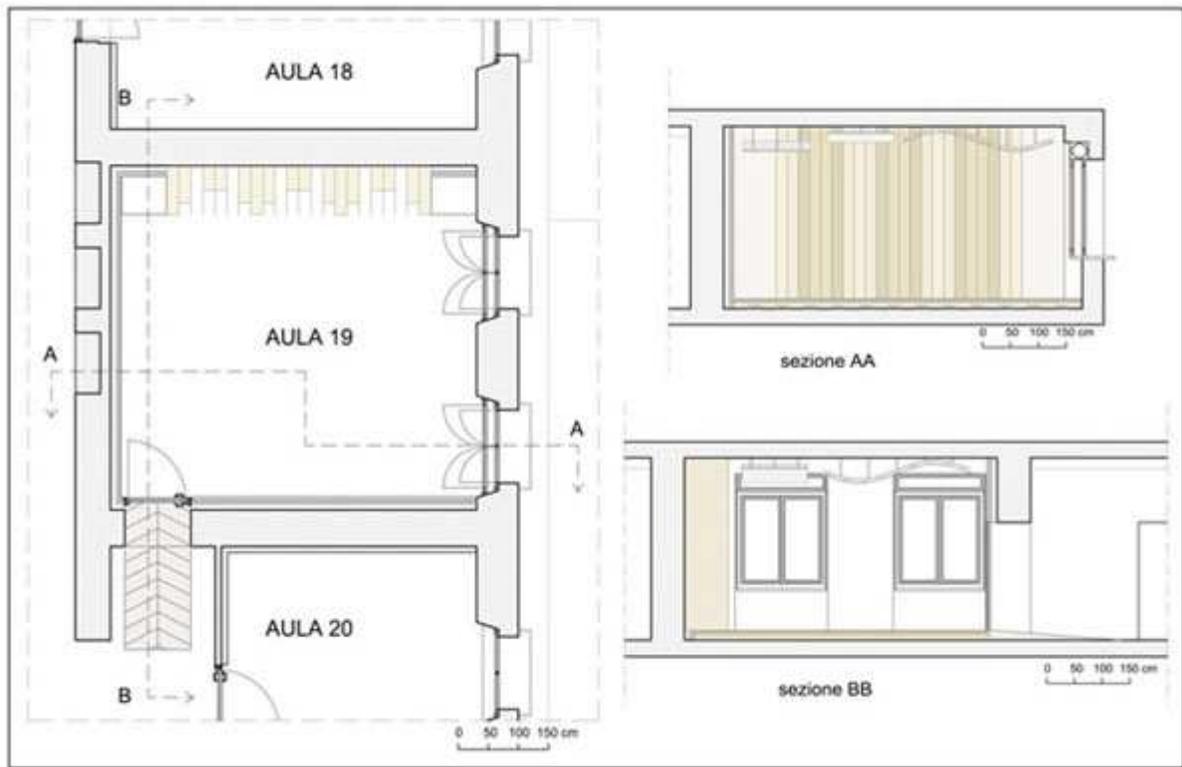
Still in the first section are listed the instrument studied in the conservatories and there is a critical analysis of some existing conservatories and school of music. The purpose is to catch the relationship between the building and the surrounding, to analyse the disposition of the practice rooms and the technology used to made them, so that is possible to find the characteristics that are repeat in more projects and that are the right ones to use.

The second section, indeed, shows the project of acoustic requalification of a room of the the *Giuseppe Verdi* Conservatory of Turin, that doesn't have the right quality to host music lessons. In fact is possible hearing the music played in the classrooms also in the corridors or outside the building, and the students complain about the sound made in the other rooms. The windows have old frames, the doors are a simple panel of wood, closet and niches permitted the propagation of the sound. The offices of the school are placed below practice rooms, so they hear the music played during the lessons. Furthermore the proportion of the dimensions of the rooms is not respected, with the consequent problems of modes.



Plans of the Giuseppe Verdi Conservatory of Torino

With the theories explained in the first section, was given to the teachers the survey, to understand the sound problems that they find in the classrooms. After, the acoustic measurements of reverberation time, the sound insulation and the sound pressure level were made, remarking the results and trying to find solutions. Finally an acoustic project of one room was proposed. Referring to the laws that talks about the classrooms used for playing music, is possible to calculate the maximum levels of sound listened in the next rooms, to find the modal frequencies harmful and to realize particular object that are able to improve the sound quality in a small room.



Plan and sections of the classroom used for the project of the acoustic requalification

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