

Abstract Submitted
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Intonation and compensation of fretted string instruments¹

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— We discuss theoretical and physical models that are useful for analyzing the intonation of musical instruments such as guitars and mandolins and can be used to improve the tuning on these instruments. The placement of frets on the fingerboard is designed according to mathematical rules and the assumption of an ideal string. The analysis becomes more complicated when we include the effects of deformation of the string and inharmonicity due to other string characteristics. As a consequence, perfect intonation of all the notes on the instrument cannot be achieved, but complex compensation procedures can be introduced to minimize the problem. To test the validity of these procedures, we performed extensive measurements using standard monochord sonometers and other acoustical devices, confirming the correctness of our theoretical models. These experimental activities can be integrated into acoustics courses and laboratories and can become a more advanced version of basic experiments with monochords and sonometers.

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