



# Mathematics and Music: Composition, Perception, and Performance

*James S. Walker, Gary W. Don*

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At first glance, mathematics and music seem to be from separate worlds—one from science, one from art. But in fact, the connections between the two go back thousands of years, such as Pythagoras's ideas about how to quantify changes of pitch for musical tones (musical intervals). **Mathematics and Music: Composition, Perception, and Performance** explores the many links between mathematics and different genres of music, deepening students' understanding of music through mathematics.

In an accessible way, the text teaches the basics of reading music and explains how various patterns in music can be described with mathematics. The authors extensively use the powerful time-frequency method of spectrograms to analyze the sounds created in musical performance. Numerous examples of music notation assist students in understanding basic musical scores. The text also provides mathematical explanations for musical scales, harmony, and rhythm and includes a concise introduction to digital audio synthesis.

Along with helping students master some fundamental mathematics, this book gives them a deeper appreciation of music by showing how music is informed by both its mathematical and aesthetic structures.

## *Web Resource*

On the book's CRC Press web page, students can access videos of many of the spectrograms discussed in the text as well as musical scores playable with the free music software MuseScore. An online bibliography offers many links to free downloadable articles on math and music. The web page also provides links to other websites related to math and music, including all the sites mentioned in the book.

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