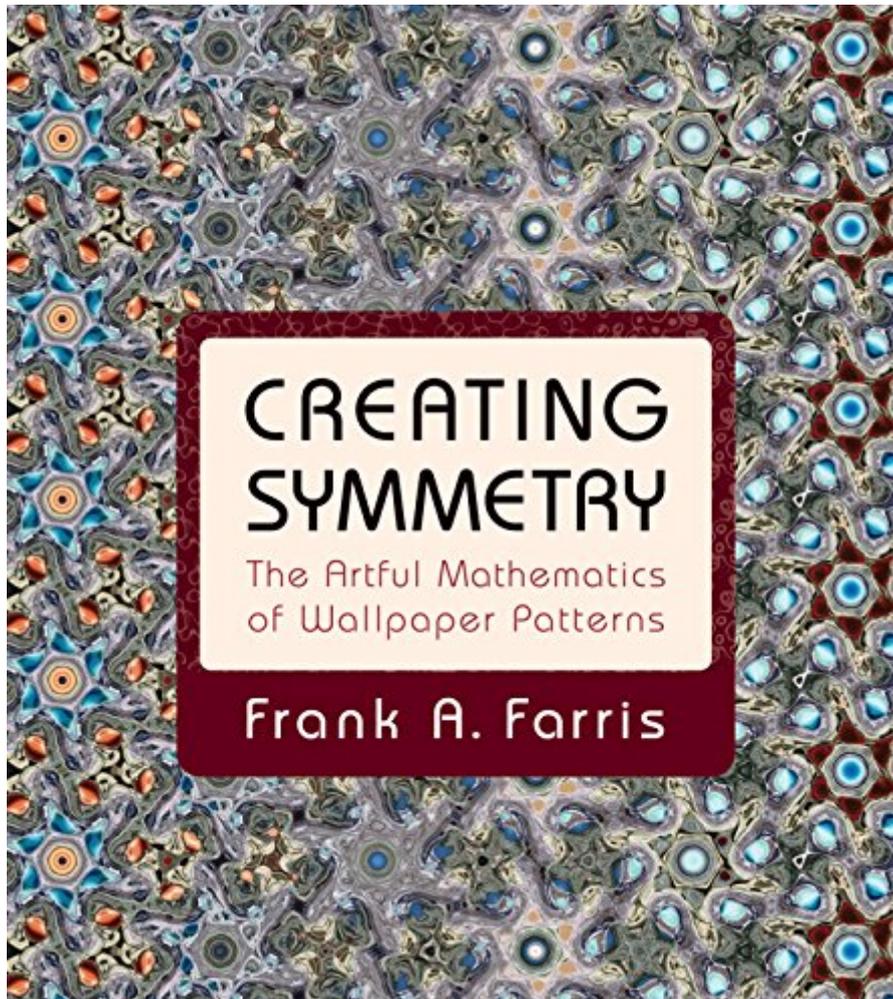


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# Creating Symmetry: The Artful Mathematics Of Wallpaper Patterns



## Synopsis

This lavishly illustrated book provides a hands-on, step-by-step introduction to the intriguing mathematics of symmetry. Instead of breaking up patterns into blocks—a sort of potato-stamp method—Frank Farris offers a completely new waveform approach that enables you to create an endless variety of rosettes, friezes, and wallpaper patterns: dazzling art images where the beauty of nature meets the precision of mathematics. Featuring more than 100 stunning color illustrations and requiring only a modest background in math, *Creating Symmetry* begins by addressing the enigma of a simple curve, whose curious symmetry seems unexplained by its formula. Farris describes how complex numbers unlock the mystery, and how they lead to the next steps on an engaging path to constructing waveforms. He explains how to devise waveforms for each of the 17 possible wallpaper types, and then guides you through a host of other fascinating topics in symmetry, such as color-reversing patterns, three-color patterns, polyhedral symmetry, and hyperbolic symmetry. Along the way, Farris demonstrates how to marry waveforms with photographic images to construct beautiful symmetry patterns as he gradually familiarizes you with more advanced mathematics, including group theory, functional analysis, and partial differential equations. As you progress through the book, you'll learn how to create breathtaking art images of your own. Fun, accessible, and challenging, *Creating Symmetry* features numerous examples and exercises throughout, as well as engaging discussions of the history behind the mathematics presented in the book.

## Book Information

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## Customer Reviews

I want to rate this book much higher. It's got some great material, fascinating formulas, beautiful graphics. However, the way the book was written makes it lose so much of its value, it makes me sad. First of all, the author identifies three target audiences: the working mathematician, the advanced undergraduate, and the "less experienced reader". "Less experienced" readers are still expected to have a knowledge of calculus, calculating derivatives of functions and integrals. So a lot of readers will find themselves lost almost immediately. This is not a bad thing in itself. But some effort to make the book more accessible would have given it a much wider audience, which is disappointing to me. Secondly, the book screams for its examples to be coded in graphics software. That is why most people will be buying this book - to make the pretty pictures they see on the cover and as they flip through it. But it is not a software oriented book at all. You will not find ANY code in this book, just pure math. There is not even any software on any site that you could download to experiment with. The author does mention that he has developed some software that he used to create the images in the book, and even shows screenshots of the interface. But this software is not publicly available. He does mention that he sometimes gives the code out to people who correspond with him, if they promise not to complain about it. Of course, it's not TOO difficult to take the formulas and create a graphic rendering system for them, if you have experience as a developer. In summary, the book has some brilliant material, but if you are not experienced in math and programming, your head will be spinning half way through the first chapter.

Are you a mathematician? If you are, then this book is for you. Author Frank A. Farris, has written an outstanding book that introduces you to the creation of mathematical symmetry: The artistic process of making choices among the vast infinity of mathematical patterns - free to wave and curve, but constrained by the limitations of pattern type. The author begins by showing you how to make a circle and other curves. Next, he discusses how complex numbers make it easier to keep track of circles, curves and rotations. Then, the author explains why the mystery curve has a 5-fold symmetry. Also, the author discusses what algebraic and analytic structures, best describes the

families of curves. He then surprises us, in a suitable sense, that every periodic curve in the plane can indeed be written as a superposition of waves, even though infinitely, many are required in general. Then, the author discusses how you can extend your curves with  $m$ -fold symmetry to functions from  $\mathbb{C}$  to  $\mathbb{C}$ . In addition, he defines plane symmetry; studies a particular class of patterns; the rosettes; and, construct spaces of functions that, with the domain-coloring algorithm, allow you rich opportunities for creating symmetry. Also, the author then explains what the various possible frieze groups are. He then makes a more literal connection, even to surfaces moving up and down; modeling the swells in the ocean— not the waves crashing on the shore. Next, the author continues by unveiling the wave packets, superpositions of particular waves that dance together to create symmetry. Then, he discusses what other symmetries are possible in wallpaper functions with 3-fold symmetry. Also, the author discusses what algebraic structures describe the symmetries of functions with 3- or 6-fold rotations.

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