



Institute for Mathematics and its Applications

Surfing with Wavelets



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7:00 pm

125 Willey Hall
225 19th Avenue South
University of Minnesota
Minneapolis

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MATH MATTERS
IMA Public Lecture Series

Wavelets are used in the analysis of sounds and images, as well as in many other applications. The wavelet transform provides a mathematical analog to a music score: just as the score tells a musician which notes to play when, the wavelet analysis of a sound takes things apart into elementary units with a well defined frequency (which note?) and at a well defined time (when?). For images wavelets allow you to first describe the coarse features with a broad brush, and then later to fill in details. This is similar to zooming in with a camera: first you can see that the scene is one of shrubs in a garden, then you concentrate on one shrub and see that it bears berries, then, by zooming in on one branch, you find that this is a raspberry bush. Because wavelets allow you to do a similar thing in more mathematical terms, the wavelet transform is sometimes called a "mathematical microscope."

Wavelets are used by many scientists for many different applications. Outside science as well, wavelets are finding their uses: wavelet transforms are an integral part of the image compression standard JPEG2000.

The talk will start by explaining the basic principles of wavelets, which are very simple. Then they will be illustrated with some examples, including an explanation of image compression.



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