

**THE HARMONIC MATRIX**  
EXPLORING THE GEOMETRY OF PITCH  
Deryn Bond

**THE HARMONIC MATRIX**  
This poster is a visual representation of the harmonic matrix, a mathematical structure that explores the geometry of pitch. It is a 2D grid of colored squares, where each square represents a specific harmonic relationship between two pitches. The colors are based on the frequency ratio between the two pitches, with red representing a ratio of 2:1 (octave), blue representing 3:2 (perfect fifth), and green representing 4:3 (perfect fourth). The grid is symmetric about the main diagonal, which represents the identity function  $f(x) = x$ .

**DEFINITIONS & DIAGRAMS**  
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**ACCESS & APPLICATIONS**  
The harmonic matrix has many applications in music theory and composition. It can be used to generate musical scales, chords, and melodies. It can also be used to analyze the harmonic structure of existing music. The harmonic matrix is a powerful tool for understanding the geometry of pitch and its relationship to music.

Presented at International Computer Music Conference and Subtle Technologies, 2011 [poster sessions].

Email me if you'd like a larger, more legible version of this poster. Somewhat easier to follow than the paper, I now know that this poster and the paper deeply gouge the surface of this subject but there is still more to be done. Already the hybrid matrices and variable, irregular dimensional structures beg for more attention.

Many thanks to those who visited the poster and tested out the devices.

## ICMC - Harmonic Matrix Theory

Written by D. Bond

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The ustring equation was not published. define  $q$  as the matrix dimension then values are given by:

$$n > 0 = q / (q - n)$$

$$n < 0 = (q - |n|) / q$$

then Eureka! Quite simple - in one step:  $(q / (q - |x| + 1))^{(x / |x|)}$ .

My bad for not solving this prior to publication.

Copies of the ICMC paper available [here -external link](#) . Feedback and inquiries most welcome.