Trevor O. de Clercq
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Digital Audio Processing
E85.2600, Prof. K. Peacock

ASSIGNMENTS

I. Quantization Levels

The following are quantization levels for different bit word lengths:

16 bit= 65,536 combinations
18 bit= 262,144 combinations
20 bit= 1,048,576 combinations
24 bit=16,777,216 combinations

II. ASCII Name Representation

The following are associated ASCII order numbers for each letter and space in my name:

T r e v o r d e C l e r c q
84 114 101 118 111 114 32 100 101 32 67 108 101 114 99 113

IV. Fibonacci Biography

Leonardo Fibonacci (1170-1240 A.D.) was famous Italian mathematician during the Middle Ages, born in Pisa and educated in Algeria. His work as a merchant took him to various commercial centers where he acquired a basis in Greek and Arabic mathematical systems. His most influential publication, *Liber abaci* does away with the Roman abacus and introduces the methodology of Arabic algebra. His Fibonacci sequence was invented while trying to model an equation after the reproductive patterns of rabbits.

V. Bela Bartok's Music for Strings, Percussion & Celeste Review

I have listened to this Bartok piece many times in my life. The first movement is the famously controversial example of a Fibonacci series. Bascially, this first movement is a highly organized fugue based on a twisting chromatic subject. During the movement, meters are constantly changing and tonal centers are shifting often. Many of the key relationships in this first movement are based on tritones, and even the movement as a whole can be seen as a move from a tonal center of A to D# and back to A (tritone again). Overall, the six odd minutes of this movement outline a sense of growth where listeners experience a feeling of surge followed by repose. The Hungarian theorist Erno Lendvai used the Fibonacci series to explain and describe Bartok's methodology for constructing this rising and falling pattern.

VI. Golden Section Proof

Let y=any given length
Let x=the portion of y equivalent to the golden section
Find x/y, the ratio any golden section
The golden section is defined as x/y=(y-x)/x
Therefore, y(y-x)=x(x)
Also, $y^2-xy=x^2$
And, $y^2-xy-x^2=0$
Using the quadratic equation to solve for y....
$[(-(-x)(+/-)/x^2-4(1)(x^2)]/2(1)$ which reduces to: [x+x/5]/2
which reduces to: 1.618x
Therefore, y=1.618x
Solving for x/y=0.618