How the Golden Ratio Relates to Resonance and Bandwidth

K is the Golden Ratio constant in respect to a resonant frequency and it's Bandwidth

(Pedagogy)

$$n = \sqrt{(n * K)\left(\frac{n}{K}\right)}$$

(Frequency of Resonance)

$$fresonance = \sqrt{fc\ upper * fc\ lower}$$

$$fc\ upper = fr * K; \qquad fc\ lower = \frac{fr}{K}$$

$$fr = \sqrt{(fr * K)\left(\frac{fr}{K}\right)}$$

(Bandwidth)

$$Bw = fc\ upper - fc\ lower$$

$$Bw = (fr * K) - \left(\frac{fr}{K}\right)$$

Solve for K:

The "+" in the radical part of the quadratic formula is from 4a(-c)

$$\begin{cases} Phi = K = \dfrac{\sqrt{Bw^2 + 4\,fr^2} + Bw}{2\,fr}, & F \neq 0\ and \dfrac{B + \sqrt{4\,F^2 + B^2}}{2\,F} \neq 0 \\ -\left(\dfrac{1}{Phi}\right) = K = -\dfrac{\sqrt{Bw^2 + 4\,fr^2} - Bw}{2\,fr}, & F \neq 0\ and\ -\dfrac{\sqrt{4\,F^2 + B^2} - B}{2\,F} \neq 0 \end{cases}$$

This formula is universal for Ohm's Law, and magnetism.

Ohm's Law: (b) = P-R; (f) = e; and (K) = i *Magnetism: (b) = μ-ε; (f) = t; and (K) = Z*

+b, +f = (K); -b, +f = (1/K); -b, -f = (-1/K); +b, -f = (-K)

n•K = the proportion of (∞ → n+b) = (n+b → n); n/K = the proportion of (1/∞ → n-b) = (n-b → n) where n = a•(-c); and b is positive.