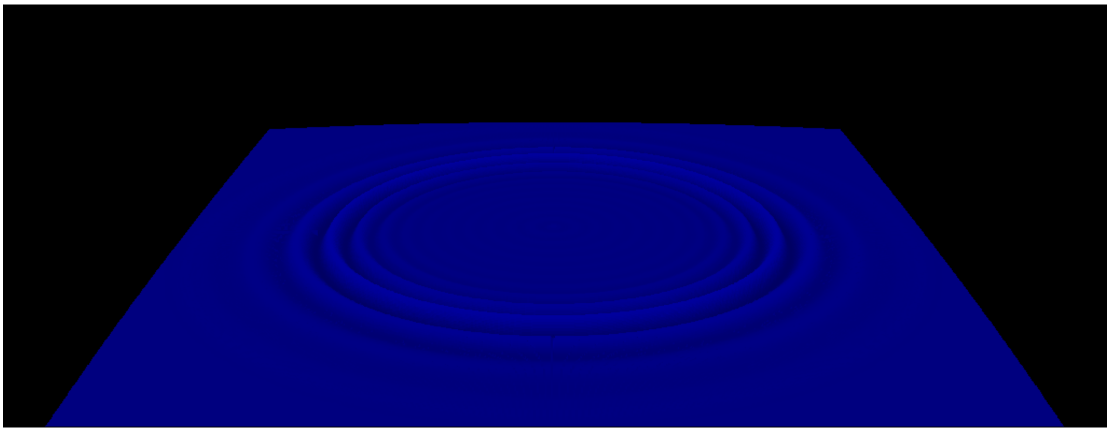
Circular Surface Water Waves



Above picture created from the formula below as a discrete summation;

$$\eta\ (r,t) = (1/g) \int_0^{\infty} \alpha_c \cdot \omega \cdot \mathbf{sin}(\omega t) \cdot \mathbf{J}_0(cr) \cdot dc$$ - a Bessel-Fourier Integral

Discrete Summation version;

$$\eta\ (r,t) = (1/g) \sum_{c=0}^{m} \alpha_c \cdot \omega \cdot \sin(\omega t) \cdot \mathbf{J}_0(cr) \cdot \Delta c$$

where $\alpha_c = \exp(-(c\text{-}m/2)^2)$ - a suitable “bell” shaped function

and $\Delta c = (\text{wave number spread})/m$

and $\omega = \sqrt{(g \cdot (\text{wave number}))}$

and $$\mathbf{J}_0(cr) = (1/\pi) \int_0^{\pi} \mathbf{cos}\{cr \cdot \mathbf{sin}(\theta)\} \cdot d\theta$$ - Bessel’s First Integral

known as the “zeroth” order Bessel Function of the First Kind, obviously evaluated on the computer using a finite sum approximation.

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