

Why Renormalization Works

António Saraiva – 2010-02-15
ajps2@hotmail.com

See Unified Absolute Relativity Theory at:

www.wbabin.net/saraiva/saraiva305.pdf
www.wbabin.net/saraiva/saraiva306.pdf
www.wbabin.net/saraiva/saraiva307.pdf

Renormalization works because infinite is equal to zero.

$$e^{ix} = \cos x + i \sin x$$

For $x = \pi$:

$$e^{i\pi} = -1$$

$$\log e^{i\pi} = \log(-1) \quad \Leftrightarrow \quad \log(-1) = i\pi$$

Lets prove that infinite is equal to zero:

$$0 = + \infty = - \infty$$

$$\log 0 = \log(+ \infty)$$

$$- \infty = + \infty$$

$$\log(- \infty) = \log(+ \infty)$$

$$\log(-1) + \log(+ \infty) = + \infty$$

$$i\pi + (+ \infty) = + \infty$$

$$+ \infty = + \infty$$

$$+ \infty$$

$$i\pi \left[\frac{\quad}{+ \infty} \right]$$

$$+ \infty = \sqrt{(i\pi)^2 + (+ \infty)^2}$$

$$+ \infty = \sqrt{-\pi^2 + (+ \infty)^2} = + \infty$$

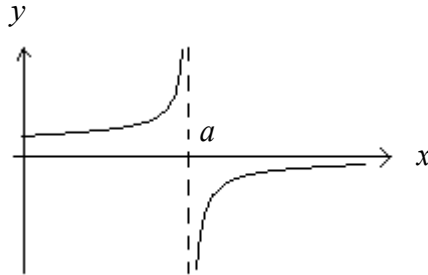
So:

$$0 = + \infty = - \infty$$

Mathematical and natural equations

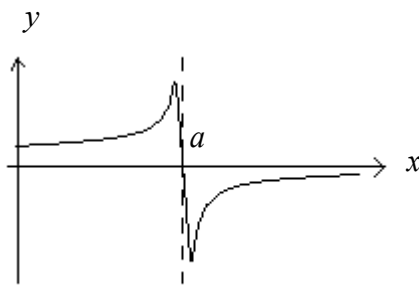
Mathematical equation:

$$y = \frac{1}{a - x}$$



Natural equation:

$$y = \frac{a - x}{(a - x)^2 + a}$$



$$x_{MX} = a \pm \sqrt{a} \quad ; \quad y_{MX} = \pm \frac{1}{2\sqrt{a}}$$

This natural equation happens in several real problems as the double sonic boom and the slow light propagation.

Group speed in UART

Phase speed:

$$w = \sqrt{c^2 - Sf^2} \quad ; \quad w = \frac{cx}{\sqrt{S + x^2}}$$

Group speed:

$$V = \frac{d\omega}{dk}$$

$$c^2 t^2 - x^2 = S \quad \Leftrightarrow \quad \omega = \frac{2\pi \cdot kc}{\sqrt{4\pi^2 + Sk^2}}$$

$$V = \frac{cx^3}{(S + x^2)^{3/2}} ; \quad V = \frac{(c^2 - Sf^2)^{3/2}}{c^2}$$

$$V = \frac{w^3}{c^2}$$

w -- Phase speed; c -- Light speed; $S = 1.9 \times 10^{-34} m^2$; f -- Frequency;
 x -- Wavelength; V -- Group speed; $\omega = 2\pi f$ -- Angular speed;
 $k = 2\pi / x$; t -- Period.