

The knowledge of mass and acid

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Abstract

In this paper, I describe the knowledge of mass and acid.
The paper ends with "The End"

Introduction

There exists a demand for knowledge from me of mass and acid.
In this paper, I describe the knowledge of mass and acid.

The mathematics of mass and acid

The system of differential equations

$$\frac{\partial M(t)}{\partial t} = \mu M(t) + \rho A(t)$$

$$\frac{\partial A(t)}{\partial t} = \lambda M(t) + \omega A(t)$$

with initial conditions

$$M(0) = M$$

$$A(0) = A$$

where

M is the initial mass

A is the initial acid

μ is the sub-exponential growth rate of mass with respect to mass

ρ is the sub-exponential growth rate of mass and with respect to acid

λ is the sub-exponential growth rate of acid with respect to mass

ω is the sub-exponential growth rate of acid with respect to acid

and

t is time

has the solution

$$M(t) = e^{\frac{1}{2}(\mu+\rho)t} \left(\frac{(\mu M - \rho(2A + M)) \sinh\left(\frac{1}{2}t\sqrt{(\mu-\rho)^2 - 4\lambda\rho}\right)}{\sqrt{(\mu-\rho)^2 - 4\lambda\rho}} + M \cosh\left(\frac{1}{2}t\sqrt{(\mu-\rho)^2 - 4\lambda\rho}\right) \right) \dots [1]$$

$$A(t) = e^{\frac{1}{2}(\mu+\rho)t} \left(\frac{(A(\rho - \mu) + 2\lambda M) \sinh\left(\frac{1}{2}t\sqrt{(\mu-\rho)^2 - 4\lambda\rho}\right)}{\sqrt{(\mu-\rho)^2 - 4\lambda\rho}} + A \cosh\left(\frac{1}{2}t\sqrt{(\mu-\rho)^2 - 4\lambda\rho}\right) \right) \dots [2]$$

A solution to $M(t) = m$ and $A(t) = a$

A solution to the simultaneous equations $M(t) = m$ and $A(t) = a$ where m, a and t are reals is available upon request.

The End