Keywords: Zeta functions; Dash pod systems; Mean functions

Introduction

But in special cases one can hope to say something. When the solutions are the points of an abelian variety, the Birch and Swinnerton-Dyer conjecture asserts that the size of the group of rational points is related to the behavior of an associated zeta function $\zeta(s)$ near the point $s=1$. In particular this amazing conjecture asserts that if $\zeta(1)$ is equal to 0, then there are an infinite number of rational points (solutions), and conversely, if $\zeta(1)$ is not equal to 0, then there is only a finite number of such points [1].

Explanation

Equation of motion

From Verruijt, we know the equation of motion for a mass–spring- dashpod system is:

$$ m\ddot{u}+c\dot{u}+ku=0 $$

So, taking the resonant frequency into account, the equation from Verruijt becomes:

$$ \ddot{u}+2zw_0\dot{u}+w_0^2u=0 $$

Where $w_0$=resonant frequency and $z$ is a measure of the system damping [2].

At critical damping, the characteristic equation is the golden mean function:

$$ x=-1/(x-1) $$

Or,

$$ x^2-x-1=0 $$

The roots to this equation are, of course, -0.618 and 1.618.

Value for $i$-the imaginary number

Now, before examining zeta $z$ in equation form, we calculate a real value for the imaginary $i$ = $\sqrt{-1}$

So, $\sqrt{-1}$ = -0.618, 1.618

Damping ratio zeta $z$

Now, $zeta=z$=damping ratio=$w/w_0$:

$$ \frac{d\dot{u}}{dw} = \frac{w}{w_0} = \sqrt{1-2z^2} $$

Algebraically:

$$ d\dot{u}/dw = w = w_0*\sqrt{1-2z^2} $$

Taking the derivative:

$$ \frac{d\dot{u}}{dw} = w = \frac{w_0}{2(1-2z^2)1.5}/1.5 $$

In the Birch conjecture, there are two possibilities to consider [3]. They are:

For $z(1)=0$ and $z(1)(not=)0$

In the second case, we have critical damping. $z(1) (not=) m \ 0$

Say $z(1)=1$

$1=w_0/3[1-2(1)2]1.5$ w0=3

Or w0=0 w0 is a real number. In case 1 again:

$$ z(1)=0,w_0=0 $$

Critical damping

In the second case, we have critical damping. $z(1) (not=) m \ 0$

Say $z(1)=1$

$1=w_0/3[1-2(12)1.5] w0=3$

Or w0=0 w0 is a real number. In case 1 again:

$$ z(1)=0,w_0=0 $$

*Corresponding author: Cusack P, Independent Researcher, Canada, Tel: (506) 214-3313; E-mail: St-Michael@hotmail.com

Received February 08, 2016; Accepted April 29, 2016; Published May 05, 2016


Copyright: © 2016 Cusack P. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
\[
du/dw = 0 \quad w(0) = \sqrt[2]{(1-2z^2)} \\
w(0) = (1-2z^2) w(0) = 0 \\
w(0) = 0/0 \text{ Dividing by zero has infinite solution. Now, finally, in the critical damping case:} \\
du/dw = 0 \quad w(0) = \sqrt[2]{(1-2z^2)} w(1) = \sqrt[2]{(1-2z(1/2))} \\
w(1) = \sqrt[2]{(1-2)}(c1) \\
\text{We know } \sqrt[2]{(1-1)} = -0.618, \ 1.618. \text{ So, } w = -0.618 \ 0r \ 1.618 w(0) = 0.618 \ 0r \ 1.618. \text{ Therefore there is a real solution to } z \text{ at critical damping [4,5].}
\]

**Conclusion**

Simple Mechanics combined with knowledge of the zeta function and the value of the imaginary number provides the ingredients to solve the Birch and Swinnerton-Dyer Conjecture.

**References**