

$$\varphi_{tt} - \varphi_{xx} + \sin \varphi \neq Human_{tt} - Human_{xx} + \sin(Human)$$

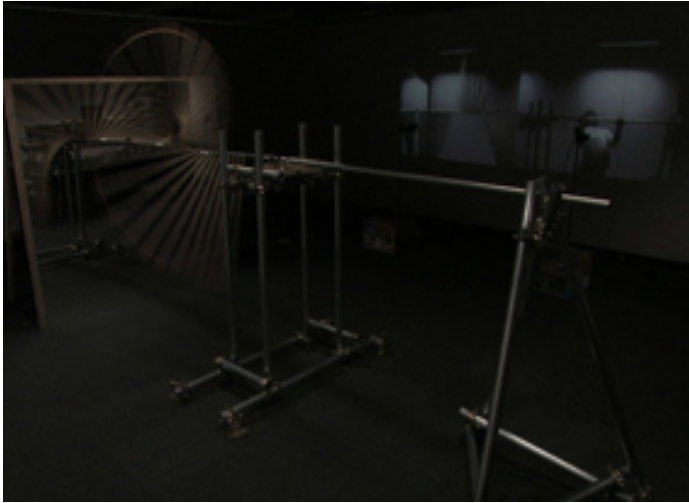
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ABSTRACT

Human possess the sense of time and direction. The lapse of time for a person should be the accumulation of memory, but not the deterioration of a machine. Since the birth of machines, people engaged in delegating their burden to machines, eventually forcing themselves to live in machine time. As a result, it seems today that biological time, the gift of nature, is all but forgotten. We express with soliton wave featured as a phenomenon which does not have any time direction to reactivate the sense of time.

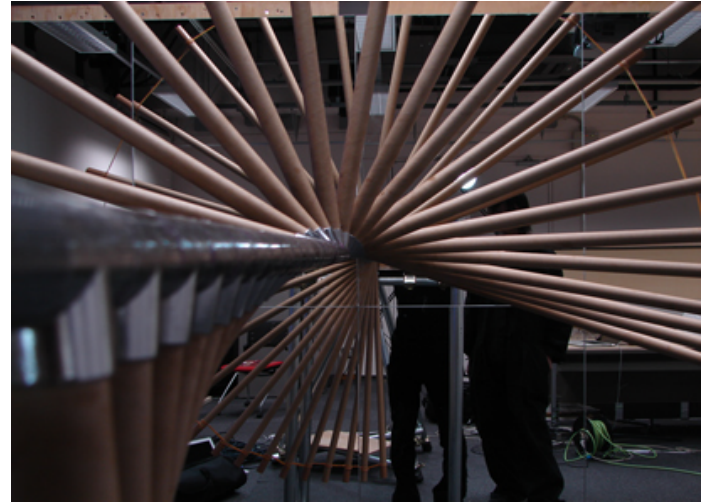
Keywords

Time, Soliton, sine-gordon, Entropy, Incompleteness, Real World, Incompleteness

A Concept of Time

Time flows in certain direction. It is irreversible, and the law of entropy applies. The past has less entropy, and the future has more entropy. When we watch reversed video and feel strange, it means there was Time direction.

Here is an interesting example. Say there is a coin on the table, and you keep hitting it. When hit, it flips over with probability 0.5. You record this scene, and play it backwards. It should look as if the video was normally played. In other words, there is no certain direction of time here. Next, you do exactly the same thing with 100 coins. At the beginning, all coins are heads. By probabilistic logic, half of the coins should become tails while keep hitting them. This time, the reversed video should look unnatural, since gradually all the coins become heads.



Soiton(sine-gordon equation)

There is a phenomenon which does not have any time direction.

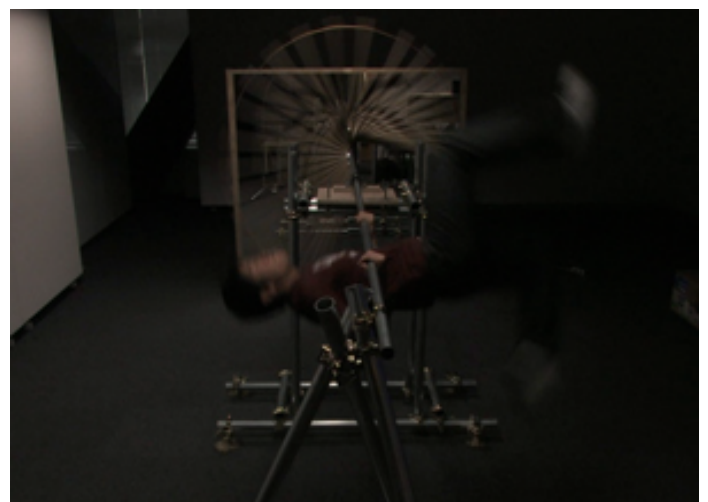
In this work, Soliton is featured as such a phenomenon. I mean entropy increasing is invisible in soliton wave. When the user (which by nature has time direction) interacts with this work, he/she will be able to reactivate the sense of time within him or herself in contrast to the Soliton.

This work applies sine-Gordon equation, which can be used to express the theory of relativity. In the theory of relativity, The length of an object shrinks according to speed and direction of its movement.

About " $\varphi_{tt} - \varphi_{xx} + \sin \varphi \neq Human_{tt} - Human_{xx} + \sin(Human)$ "

No matter how hard the user tries to imitate the movement based on sine-Gordon, the backward played video vividly highlights the incompleteness of user's movement, the fact that human possess time direction indivisibly.

We will be happy if users remember the interaction with this work, and rediscover the sense of time. The backward playing video of Soliton itself does not indicate any time direction, but when movement of human comes in, the existence of time direction is clear. An experient can watch the reversed movie with projection after he/she do forward upward circling on the horizontal bar.



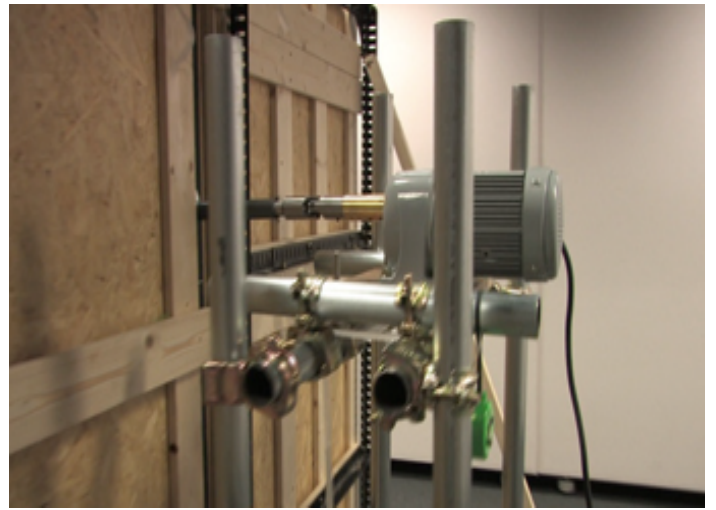
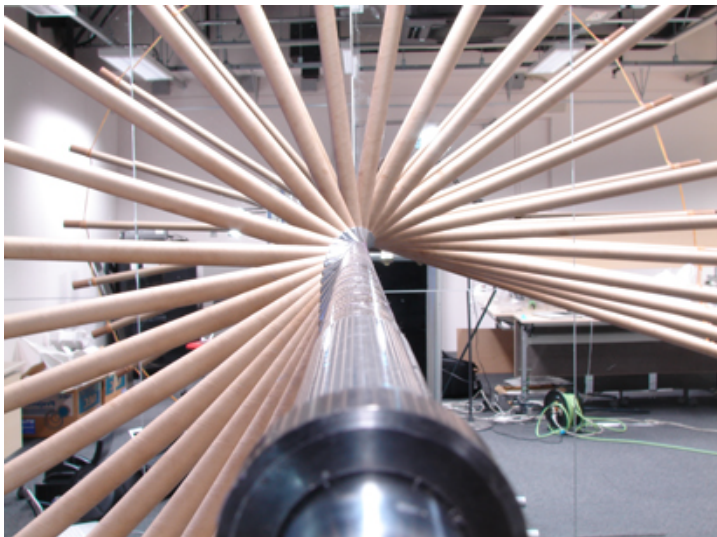


Machine and living being

This work utilizes friction as energy by using Damper grease. Generally, machine design takes either stance toward friction. To reduce it as low as possible, or to increase it as high as possible. This one stands in the middle. We have decided to utilize friction as a complement of rotating energy. When self rotating power and friction power meets, this work starts to move. The axis rotates at a speed of 180rpm (rotates 3 times a second). The speed of rotation determines the force added to the paper bar. This work aims to stand between machine and living being.

The incompleteness

The core feature of this work that attracts users is its incompleteness that reflects the real world. This can not be able to realize by pure simulation. Incompleteness makes the sense of time and direction. We made this work big because unstable elements and feeling of strain increase when they make a thing big. When we are able to see such an imperfection in regularity, surpassed kinetic art. So this is new. In general, "incompleteness" means failure. Although, therein lies reality.



System

A motor, inverter, bearing, the axis of the stainless steel, a paper pipe, rubber band, a horizontal bar, two camera, three PC, a projector, a mirror, grease.

Friction with stainless bar and couplings give energy of rotation.

Take a 70cm paper pipe, and hang free swing pendula from the rod at regular intervals.

Connect them with rubber bands which are tight when the pendula all hang straight down.

Put grease to take friction.

Turn the motor.

Pull them over the top of the rod.

We use strain sensor to take if user do forward upward circling on the horizontal bar or not.

This is one kind of experiment that I made.

http://www.youtube.com/watch?v=EoEcoZbsPow&feature=channel_page

