**Inequality of any two real number sequences and its study**

**Abstract:** Inelastic collision is very common natural phenomenon. So it is very important to study the quantity relation of inelastic collision. The motion of common velocity is a typical inelastic collision. This article first discusses the energy loss problem of the common motion and to get a energy loss equation for the motion of the common velocity. From the point of view that themotion is inelastic collision, the inequality based on natural number field is derived. Then the inequality of any two real numbers sequences based on real number field is extended. Finally, strict mathematical proofs are given and discuss some special cases. At the end of this paper, the inequality is specially extended. A new type of sequence is defined and its properties are discussed.This inequality can provide a powerful mathematical tool for solving related problems and optimizing calculation process.

**Keywords**: Inelastic collision; Motion of common velocity; Real number sequence Inequality; Vector.

1.  **Inequalities based on the field of natural numbers**

Inelastic collision is a very common natural phenomenon. In case of relevant problems we usually use the conservation of momentum law. The motion of common velocity is a typical inelastic collision. Therefore, this paper studies the energy loss of the common motion and uncover the quantitative relationship.

Under ideal conditions, let’s say I have objects on the horizontal plane. At some point a collision occurs. After the collision, the motion of common velocity occurs. In the collision process there is the following relationship: Let’s say the total kinetic energy of the system before the collision is ,the total kinetic energy of the system after the collision is ,the common velocity of the system is .There are

Momentum conservation during collision, so:

Let’s say that is the kinetic energy that the system loses. There are .

To sum up there are

**(1.1)**

Because the motion of common velocity is an inelastic collision, so .And because the value range of masses and velocities is the set of natural numbers, so when the mass or velocity of the system or both is easy to know .

To sum up there are inequality based on set of natural numbers: For the sequence of natural numbers there are

**(1.2)**

**2**. **Extension and certification**

Then can reasonably guess: Is it possible to generalize (1.2) to the real number domain?

Namely for the same any two real numbers sequences and

**(2.1)**

So here’s the proof:

We take (2.1) apart and we get

①

②

③

Because

So ③ is tenable.

So (2.1) get proven.

Namely:**(2.1)**  tenable.

Easy to know,(2.1) the two-dimensional form is

**(2.2)**

To observe the (2.2) known when

In particular, in one dimensional form namely when the (2.1) perpetually take the equal sign.

In the

⑴All the items in

⑵All of the items in

⑶All of the items in

⑷There are items in

**3. Inequality promotion**

Because ③ is true and we combine it with our algorithm for vectors, So you get the vector form of the inequality.

Because

So the vector form of the inequality is

**(3.1)**

So it’s a two dimensional vector form of inequality is

**(3.2)**

Other forms of inequality are also summarized. There is at least one inequality is tenable in (3.3) for a real number sequence that meets the criteria.

**(3.3)** **or**

Here are some of the conditions that make the (3.3) equal sign true:

⑴All of the items in

⑵All of the items in

Prove:**or**

Sqrt(square root) get: **or**

So **(3.3)** isproved.

Easy to know, the two-dimensional form of the **(3.3)** is

**(3.4)** **or**

When ,（3.4）equal sign holds.

When ,（3.4）equal sign holds.

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