TORQUE AND SQUARE-ROOT-FUNCTION

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Abstract

- A new view on the root-function.
- Numbers used in their particular, mathematical function – as the value of a measure in a unit.
- By example, a view on that multiplications (genuine multiplication) which produce new units.
- The way to understand why the square-root of a negative radicand is solvable by an operational way and why we have to define the root-function new.
- Altogether the first step of a restructuring of whole the numerical mathematics – a reform of the signs.

Keywords: Number, root-function, negative radicand, torque

Introduction

We learned the three binoms; did we understand them? Where are the other ones; for example that one which produces $-a^2 - 2ab - b^2$?

A product, an area, gets negative by definition of width and depth. Should a farmer, who buys it, add it to his land or must he subtract it? What do the signs of a multiplication (by the rules of the binoms) have to do with the logic of balance in the new unit which is produced by the multiplication?

We had to learn the equivalence from Leonhard Euler[i]). He used the imaginary unit. But this wasn't the only fault in the development of it[ii]). If we follow the main text we couldn't follow Euler.

The square-root is blind for two sectors of the area which is determined by the Cartesian coordinates. Let's make the view free to the areas '+x * –y' and '–x * +y' !

Main Text

The possibility to determine the location should be sufficient to accept the necessity of the multi-prefix-products[iii]) (short spoken: plus times plus = plus plus; minus times minus = minus minus; plus times minus

= plus minus; minus times plus = minus plus – to carry the prefixes (signs) complete) as the general basis for algebra.

Yet one could, as many specialists of that specialized field, still see that question not be replied, by that it should be established by proof, what problem could be calculated better, or at all, by the new theory — to what problem the prevailing expert opinion only has a badly way to solve or not a complete one.

The proof could be done by the right turning torque:

If the force (in the measure Newton: [N]) is depicted by the y-axis of that (by R. Cartesius) so called cartesian-coordinate-system and the length of the lever (in the measure meter: [m]) is depicted on the x-axis, then a torque (in the measure [Nm]) has an effect on the z-axis, which results from the product of the y-value by the x-value.

If, on the one hand, there is a force of six Newton in a positive direction at the end of a lever which has a length of six meters positive, so there results a **positive** torque of 36[Nm], which is to understand as a **left-turning** torque in relation to the x-/y-area (formal, mathematical: +6[N] times +6[m] = +36[Nm]).

If, on the other hand, there is a force of six Newton in a negative direction at the end of a lever which has a length of six meters negative, so there results a **positive** torque of 36[Nm] again, which also again is to understand as a **left-turning** torque in relation to the x-/y-area (formal, mathematical: –6[N] times –6[m] = +36[Nm]).

If one would determine the factors, which are the basis of the result, the basis of a product, by a re-developing way, so the square-root is given mathematical as that one what would bring the result(s).

$b = a^2 \Rightarrow \sqrt{b} = (+a) \wedge (+a) \;\vee\; (-a) \wedge (-a)$ radicand only positive

By this consideration we will ignore that 36 also is given by the (natural) number-tupels 1,36; 2,18; 3,12; 4,9 as factors[ii]). The real root — for to be unambiguity in value — is given, by conditions, as the **minimum of the absolute of the sum** of all the possible factors, which would generate the radicand as their result (why not: **the minimum of the sum of the absolutes** ...?). The minimum (of the absolute) of the sum is given if both factors are identical in value — an underestimated aspect of the root, which is a minimal-function by its nature.

$\sqrt{c} = \min[|a + b|]$ with $c = a \cdot b \Rightarrow a = b$ radicand only positive

Nice to look at the third binom $((a + b) \cdot (a - b) = c)$ yet, for which is valid that $c = \max$ for $b = 0$. What did Martinez[iv]) find (chapter one online free)?

From the left-turning torque of +36[Nm] (result) there could be determined plus six Newton and plus six meter on the one hand or minus six

Newton and minus six meter on the other hand as alternative basis in pairs through the way of solution of the classic root.

Yet it is sufficiently well-known that beside the left-turning torque a right-turning torque is possible too.

The exercise should be, one has to determine the factors which could be the reason for a generated right-turning torque of 36[Nm] by a formal identic way as for the left-turning torque.

Because if that would be possible, and only than, the mathematical formulation to the left-turning torque would be universally applicable, like mathematics claims a universal validity for itself fundamental.

Have a break in thinking!

The right-turning torque would, following the value-example of the left-turning and by identic preconditions of definition, be determined by -36[Nm]. It would be made up by the force of $+6$[N] and the lever of -6[m] on the one hand or by the force of -6[N] and the lever of $+6$[m] on the other hand.

For the prevailing expert opinion to the mathematics two problems results from that:

1. The factors, which seem to be determinable by square-root, have different measure
2. The radicand is negative

Above we avoid the problem to 1., in the use of the left-turning torque, tacitly. It would be assumed that the torque is made up of two factors of a different system of measurements (f. e. Newton and meter) which belongs to different units (force and length). A universal valid formulation shouldn't have pass or should not be useless if the problem gets special.

One could reduce intellectual to the determination of the values in itself and would resist the problem. But 'numbers by itself' make no sense if they do not stay for anything as its 'value in number' which should be calculated. But this anything formally would be determined, as well as the pure number, by a technical way of calculation, named formalism, would be determined by the mathematical way!

For example the negative values of the x-area as the western opportunities to east; the negative values of the y-area as the southern opportunities to north as the interpretation of the prefixes (the signs) in cartography.

There is no doubt about the number as the value of the measure of the force and as the value of the measure of the length. As well as we do not have to proof whether the number could be used as a factor.

But a basic condition should be considered again — the commutativity. Because above we have used the root (a construct of the multiplication — its logical reverse). And there should be no doubt about the commutativity at multiplication. Is commutativity also valid in a different system of measurements in the product?

Are specially 1[m] multiplied by 4[cm] the same as 4[cm] multiplied by 1[m]? If we do not observe the location, if only the measure of the area is interesting — surely yes.

But is 1[m] by 4[cm] area-content-identical to 1[cm] by 4[m]?

This part-commutativity (?) is fulfilled too. It is proofable by the commensurable system of measurements 'meter' and 'centimeter'. Because of the commensurability they are, each one for another, insertable in scalation. The same is valid for an incommensurable system of measurements — comprehensible, like for Newton and meter! Reconsider it.

As long as commutativity as well as part-commutativity is valid by developing a product, the inverse function, the square-root, should be able to follow logical.

We may consider the classic square-root as being the mathematical basis for factors with a different measurement as long as the values of both factors are the same; as long as the condition 'minimum of the absolute of the sum of the possible factors' stays fulfilled (min[|a + b|]).

$\sqrt{c} = \sqrt{(a \cdot b)} = (+a) \wedge (+a) \vee (-a) \wedge (-a)$ with c = positive and a = b; signs changing by OR

And at different prefixes (signs)? One could consider the differently signs of both factors, which produce the radicand, as being a system of incommensurable measurement; then 'to take the square-root' should be possible too. The condition 'minimum of the sum of the absolutes of all possible factors' would be valid for the solutions of the root (min[|a| + |b|]).

$\sqrt{c} = \sqrt{-(a \cdot b)} = (+a) \wedge (-a) \vee (-a) \wedge (+a)$ with c = neg. and |a| = |b|; signs changing by AND

If one has internalized the basis of the multi-prefix-theory[iii]), by that, amongst other things, only for the measurement, not for a unit, the possibility exists to be squared, the problem of different prefixes completely is resolved.

Irrefutable the square-roots of the right-turning torque of 36[Nm] are given by +6[N] and −6[m] or −6[N] and +6[m] as long as we work with a single prefix, the negative one (!) and unambiguous for +−36[Nm] they are given by +6[N] and −6[m] as well as for −+36[Nm] they are given by −6[N] and +6[m].

What should have been proofed.

Supplement:

'Plus times plus' equal left-turning torque just as 'minus times minus' equal left-turning torque too, on the one hand, and 'plus times minus' equal right-turning torque as well as 'minus times plus' equal right-turning torque too, on the other hand, don't confirm the prefix-rule done by the binoms, because firstly in the circumstance producing a product as an area, the position isn’t the same urgently if switching between the factors by the rules of commutativity or part-commutativity will happen and secondly the single prefix must be restricted on the summarization of the measure of the prevailing unit, for to be unambiguous in logic. Also look at: www.mathe-neu.de .

Conclusion

Now we know how to take the square-root of a negative radicand.
We have to ask about the sense of the imaginary unit.
Now we know how to differ between the two logical multiplications.
Now we know that binoms are restricted on belated balance of the factors.
Both we have to use strictly.
Because of that mathematics has to be reformed.

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