The Theory of Positional Invariance

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I hope that you enjoy this game and its message.

The "Theory of Positional Invariance" states that regardless of the observer's viewpoint the object retains its properties. There are many examples: Whether observed from the North or South poles, the moon has the same mass and craters and rotational speed. Although, the moon does appear upside down to one observer, the viewer orientation does not change the properties of the object.

Whether you look at a person from top or back or front, it is still that person with the same color eyes and personality. I asked my grandchildren, "What's my name?" Their first thought was, "Oh, no! It is happening to him." Then they said very tentatively, "Pop". "Good." I said, then turned around and asked, "Now, what is my name". One said, "It's still Pop." The other called to their grandmother, "DeeGee, something's wrong. We need help in here."

A theory starts with corroborating observations, acquires the rule, then a sophisticated sounding name to help validate it. Regardless of the observer's viewpoint, an object retains its properties: "Positional Invariance".

Applying the principle, observe that except for the 45^{o} rotation, the $\times$ and the $+$ symbols are the same; so the theory claims that $2+2=2\times 2$. There you are! Let's try with some other numbers $3+1.5=3\times 1.5$, and $(-4)+0.8=(-4)\times 0.8$, and $1+2+3=1\times 2\times 3$. But, what about complex numbers!? Here are some answers: $[(-1)+2i]+[0.75-0.25i]=[(-1)+2i]\times[0.75-0.25i]$, and $\left[(-1)+\sqrt{2}i\right]+[\frac{2}{3}-\frac{\sqrt{2}}{6}i]=\left[(-1)+\sqrt{2}i\right]\times[\frac{2}{3}-\frac{\sqrt{2}}{6}i]$. There are an infinite number of corroborating examples. I chose these examples to show that it works with negative numbers, fractions, and irrational numbers; but I kept the numbers convenient for your affirmation of the truth of the Theory of Positional Invariance.

The theory is intuitively logical, has a sophisticated name, and is confirmed by data which has an infinite number of cases. So, the claim must be true. I use this truth to support my claim that we should not be wasting time and mental effort by having students memorize both addition and multiplication facts. Addition is all that is needed.

(Yes, this torments DeeGee, a former elementary school teacher, who thinks I have no respect for the primary grade objectives. But actually, I have immense respect for the teachers, and all that is supporting what is needed at each level of education, coping with that students' persona and teaching concepts that are novel and difficult to the student. But one can have fun, also?)

Now let's see if we can relate the Theory of Positional Invariance to engineering practice and a DYP article in CONTROL. Just because there is some corroborating evidence and some intuitive basis for a fancily packaged claim, does not mean that the claim is true. Don't blindly accept either the technical folklore of your community or your preferred explanation. Don't seek evidence to support the claim. Seek evidence that could refute it. Data cannot prove. Data can only disprove. So, critically shape trials and examples to see if you can disprove the claim.

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