

Re: metric tensor 'operator' does not commute...

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I have not done the math to confirm what you have written. Taking you at your word....

The exercise you have performed is a confirmation of Heisenberg's uncertainty principle. I ask you what is the difference between the metric and position. In a sense they are the same thing. So of course they commute.

qmagick@yahoo.com wrote:

- > *Now comes*
- > *the fun part: commutation, well, fun for QM type people anyways.*
- > *If p_n is the momentum operator (i.e. $p_n = -i \hbar d/dx_n$), then*
- >
- > *$[G_{mn}, p_j] = G_{mn} p_j - p_j G_{mn} = p_j g_{mn}$ (6)*
- >
- > *Since $[G, p] \neq 0$ this means that (if you believe my formulas)*
- > *you can not simultaneously measure the metric and the momentum...*
- > *Now, I am not 100% sure on how to interpret that but I will leave*
- > *it to you to mull over. I also computed the results for*
- > *$[G_{mn}, G_{jk}] = [G_{mn}, x_k] = 0$. This means you can measure the*
- > *position and metric simultaneously no problem. It is curious that*
- > *both the metric and position commute but that each both do not*
- > *commute with the momentum.*