SIMULTANEITY IN SPECIAL RELATIVITY

by

Ardeshir Mehta

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1. Special Relativity claims that events which are simultaneous from the inertial frame of reference (or IFR) of one observer are definitely *not* simultaneous from the IFR of another observer moving rectilinearly at constant velocity relative to the first observer.

2. This means that if two events, which we shall call $\mathbf{E_1}$ and $\mathbf{E_2}$, occur simultaneously in the IFR of an observer whom we shall call Adam, then events $\mathbf{E_1}$ and $\mathbf{E_2}$ could *not possibly* occur simultaneously in the IFR of another observer — whom we shall call Eve — if Eve is moving rectilinearly at a constant velocity **v** relative to Adam.

3. This in turn means that if according to Adam's watch, event $\mathbf{E_1}$ occurred precisely at a specific time **t**, and if as indicated by Adam's watch event $\mathbf{E_2}$ also occurred precisely at the same specific time **t** — as it must if event $\mathbf{E_2}$ is to be simultaneous in Adam's IFR with event $\mathbf{E_1}$ — then event $\mathbf{E_1}$, as indicated by *Eve's* watch, must have occurred at a specific time **t'** which is different from **t** as indicated by *Adam's* watch; and as indicated by *Eve's* watch, event $\mathbf{E_2}$ must have occurred at time **t"** which is different from *both,* the time **t** as indicated by *Adam's* watch *and* from the time **t'** as indicated by *Eve's* watch.

4. (For if the times **t'** and **t"** as indicated by Eve's watch were exactly the *same*, then events $\mathbf{E_1}$ and $\mathbf{E_2}$ would have occurred simultaneously in Eve's IFR too!)

5. Thus by sentences 3. and 4. above, $\mathbf{t' \neq t''}$.

6. The above is however incompatible with the Lorentz transformation equations, which are absolutely *essential* for Special Relativity.

7. According to the Lorentz transformation equations, the time **t'** as indicated by Eve's watch must be related to the time **t** indicated by Adam's watch by the formula $\mathbf{t' = \gamma[t-(xv/c^2)]}$ where $\gamma = \mathbf{1/\sqrt{[1-(v^2/c^2)]}}$, and **x** is the distance, as measured by Adam, between Adam's watch and Eve's watch.

8. And according to the Lorentz transformation equations, the time **t"** as indicated by Eve's watch must be related to the time **t** indicated by Adam's watch by the formula $\mathbf{t'' = \gamma[t-(xv/c^2)]}$ where $\gamma = \mathbf{1/\sqrt{[1-(v^2/c^2)]}}$, and **x** is the distance as measured by Adam between Adam's watch and Eve's watch.

9. At any given time **t**, as indicated by Adam's watch, there can be only *one* distance **x**, as measured by Adam, between Adam's watch and Eve's watch.

10. Thus the value of **x** must be the same in both 7. and 8. above.

11. Since the values of the terms on the right hand sides of the equations in 7. and 8. above are *exactly identical,* **t'** must be *exactly equal* to **t"** and *cannot possibly* be different from it.

12. Thus by sentence 9. above, **t' = t"** — which contradicts sentence 5. above, according to which **t' ≠ t"** … and which therefore proves that the Special Theory of Relativity must be self-contradictory.

Any comments? e-mail me.