Linear Algebra as a Natural Language for Special Relativity and Its Paradoxes.

A talk by Prof. John dePillis, Department of Mathematics
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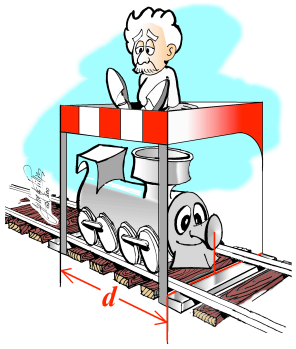


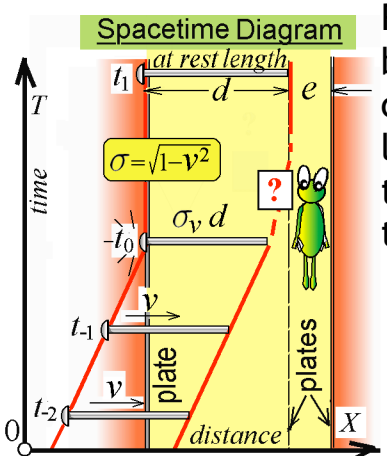
WHERE: University of Caifornia, Santa Cruz
WHEN: October 11, 2016

USING BASIC LINEAR ALGEBRA and original animations, while assuming very little knowledge of physics, we present a novel linear-algebraic derivation of the Lorentz transformation. Through the geometry of Minkowski diagrams, we analyze properties and paradoxes of special relativity.

A BASIC ASSUMPTION of special relativity (SR) is that the speed of light in a vacuum is the same for all observers regardless of their speeds or the speed of the light source. Consequences of this simple axiom are profound. For example, rods in motion shrink in the direction of motion, and clocks in motion always run slower than stationary clocks.

The TWIN PARADOX:
One twin leaves Earth in a fast rocket ship and after fifty years, say, returns to Earth, having aged only 30 years. But if each twin is in symmetric motion relative to the other, why do the twins age at different rates?.

RIGIDITY and TIME REVERSAL



Rigid systems are incompatible with SR usually because the motion of some rigid systems force certain particles to travel faster than the speed of light. However, we show in the **bug-rivet** paradox that rigidity can also cause time reversal in the sense that effect occurs before its cause