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Relativity Addition Velocity is Not a Relative Speed

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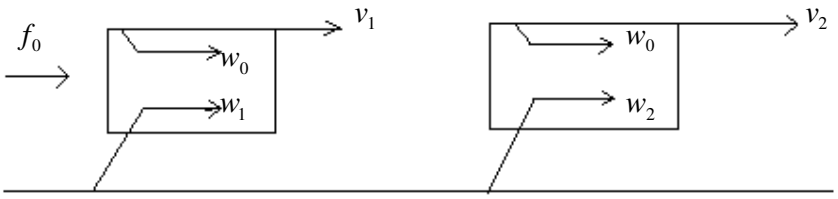

$$v_2 - v_1 = c^2 \frac{(c^2 - {w_0}^2)(w_2 - w_1)}{(c^2 - w_2 w_0)(c^2 - w_1 w_0)}$$

$$w_1 = c^2 \frac{w_0 + v_1}{c^2 + v_1 w_0} \; ; \qquad v_R = w_0 - v_1$$

w_1 is not the relative speed between w_0 and v_1, so:

$$v_x = c^2 \frac{v_2 - v_1}{c^2 - v_1 v_2}$$ is not the relative speed

The speed variation in a moving medium happens because of the frequency Doppler variation:

$$f_1 = f_0 \frac{c}{c + v_1} \qquad \text{and} \qquad f^2 = \frac{c^2 - w^2}{k} \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad w_1 = c \frac{w_0 + v_1}{c + v_1} \qquad \Leftrightarrow$$

$$\Leftrightarrow \qquad w_1 = c^2 \frac{w_0 + v_1}{c^2 + v_1 c}$$