Relativistic Addition of Velocities

what do A and B measure for their relative v?

\[ A \rightarrow V_A = 0.99c \]
\[ B \leftarrow V_B = 0.99c \]

Galilean relativity: \( V_{rel} = V_A + V_B = 1.98c \)!

Einsteinian relativity:
\[ V_{rel} = \frac{V_A + V_B}{1 + \frac{V_A V_B}{c^2}} \]

Can use this expression to show that c is the same in all inertial frames:

e.g. let B be a photon with \( v = c \)

\[ V_{rel} = \frac{V_A + c}{1 + \frac{V_A}{c}} = \frac{(\frac{V_A}{c} + 1)c}{1 + \frac{V_A}{c}} = c \]

works for A as a photon, too

\[ V_{rel} = \frac{c + c}{1 + \frac{c^2}{c^2}} = \frac{2c}{2} = c \]