Tangential Relations between Distorted Angles vs. Original Angles of a Traveling General Triangle in Special Relativity

FLORENTIN SMARANDACHE, University of New Mexico — Let’s consider a traveling general triangle $\Delta ABC$, with the speed $v$, along its side $BC$ on the direction on the $x$–axis; angles $B$ and $C$ are adjacent to the motion direction, while angle $A$ is of course opposite. Let $AM$ be the perpendicular from $A$ to the motion direction $BC$. After the contraction of the side $BC$ with the Lorentz factor $C(v) = \sqrt{1 - \frac{v^2}{c^2}}$, and consequently the contractions of the oblique-sides $AB$ and $AC$ with the oblique-contraction factor

$$OC(v, \theta) = \sqrt{C(v)^2 \cos^2 \theta + \sin^2 \theta},$$

where $\theta$ is the angle between respectively each oblique-side and the motion direction, one gets the general triangle $\Delta A'B'C'$ with the following tangential relations between distorted angles vs. original angles of the general triangle:

$$\tan A' = \tan A \cdot C(v) \cdot \frac{1 - \tan A_1 \tan A_2}{1 - \tan A_1 \tan A_2 C(v)^2},$$

where angles $A_1 = BAM$ and respectively $A_2 = MAC$;

$$\tan B' = \frac{\tan B}{C(v)};$$

$$\tan C' = \frac{\tan C}{C(v)}.$$

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