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Oblique-Length Contraction Factor in Special Relativity FLORENTIN SMARANDACHE, The University of New Mexico — The Special Theory of Relativity asserts that all lengths in the direction of motion are contracted, while the lengths at right angles to the motion are unaffected. But it didn't say anything about lengths at oblique angle to the motion (i.e. neither perpendicular to, nor along the motion direction), how would they behave? Following the STR we find that the lengths traveling with speed v, at oblique angle θ to the motion, are contracted with the **Oblique-Length Contraction Factor:**

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

$$\text{where } 0 \leq \text{OC(v,}\theta) \quad \leq 1,$$

which is a generalization of Lorentz Contractor $C(v) = \sqrt{1 - \frac{v^2}{c^2}}$ because: when $\theta = 0$, or the length is moving along the motion direction, then $OC(v, 0) = C(v)$; similarly $\text{OC(v, } \pi) = \text{OC(v, } 2\pi) = \text{C(v)}$. Also, if $\theta = \pi/2$, or the length is perpendicular on the motion direction, then $OC(v, \pi/2) = 1$, i.e. no contraction occurs; and similarly for $\text{OC(v, } 3\pi/2) = 1$.

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