

Barycentric Coordinates

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Prove that all the following ways to compute the barycentric coordinates of P are equivalent (or give counter examples),

1. let $s = \frac{CP}{Cz} + \frac{BP}{By} + \frac{AP}{Ax}$. Then,

$$P = \frac{1}{s} \left(\frac{AP}{Ax}, \frac{BP}{By}, \frac{CP}{Cz} \right) \quad (1)$$

2. let $t = EP + DP + FP$. Then,

$$P = \frac{1}{t} (DP, EP, FP) \quad (2)$$

3. let $u = A_1 + A_2 + A_3$. Then,

$$P = \frac{1}{u} (A_1, A_2, A_3) \quad (3)$$

4. let $v = zP + xC + yC$. Then,

$$P = \frac{1}{v} (Cy, Cx, zP) \quad (4)$$

