STRAIGHT LINES V2.02

This short program from the field "Vector Algebra" finds for two straight lines
L_1: $s_1 + \lambda * t_1$ and **L_2: $u_2 + \mu * v_2$**
the distance between the lines, the points P1 and P2 of the minimal distance on both lines, the intersection angle α and checks, whether the lines are parallel or have a common point of intersection. If **v_2** is entered as **{0,0,0},** the problem is handled as straight line **L_1** and point **P** with {**u_x,u_y,u_z**}. In this case the program finds the distance, the perpendicular point **x_0** and the reflected point **P'** .

EXAMPLE 1:
Given are the lines **L_1**: {**3,4,6**} + λ*{**-4,-6,-2**} and **L_2**: {**3,7,-2**} + μ*{**2,8,-4**}.
Press **prgm** and select **EXEC** LINES. Press enter enter . The screen displays:
LINE 1: S+ λ*T
S: Key in **{3,4,6** enter. **Be sure to start each entry with a brace { (the closing-brace } may be omitted) and to enter a negative value with the (-) - key !**.
Continue:
T: **{-4,-6,-2** enter
LINE 2: U+ μ*V
IF V={0,0,0}:
POINT P {UX,UY,UZ}
U: **{3,7,-2** enter
V: **{2,8,-4** enter
The result is:
DISTANCE = 2.0412414 (------- stored in variable **H**)
The program pauses here, press enter to continue:
P1 = {-6/5,-23/10,39/10} (------- stored in list $_L$P)
P2 = {7/15,-47/15,46/15} (------- stored in list $_L$Q)
$\alpha°$ = 134° 24' 55.111" = 134.4153086

EXAMPLE 2:
Given L1: {**1,1,0}+** λ*{**-1,2,-1**} and point P: {**1,2,3**}. Find the distance, point of perpendicular **x_0** and reflected point.
Press **prgm** , then select **EXEC** LINES and press enter, enter. Then make the following inputs:
S: **{1,1,0** enter
T: **{-1,2,-1** enter
LINE 2: U+ μ*V
IF V={0,0,0}:
POINT P {UX,UY,UZ}
U: **{1,2,3** enter
V: **{0,0,0** enter (---- defines the last input as point!)
Result:
DISTANCE: 3.13581
PERPENDICULAR **X0** : {7/6 , 2/3 , 1/6} (------ stored in list $_L$P)
REFLECTED POINT: {4/3 , -2/3 , -8/3 (--- mirror-image point, stored in list $_L$S) !

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