We are given the equations:

$$x_1 + t_1 \cdot dx_1 = x_2 + t_2 \cdot dx_2 \tag{1}$$
$$y_1 + t_1 \cdot dy_1 = y_2 + t_2 \cdot dy_2 \tag{2}$$

To solve for t_1 and t_2, we rearrange each equation to isolate t_1 and t_2:
From the first equation:

$$t_1 = \frac{x_2 - x_1 + t_2 \cdot dx_2}{dx_1} \tag{3}$$

From the second equation:

$$t_1 = \frac{y_2 - y_1 + t_2 \cdot dy_2}{dy_1} \tag{4}$$

Now, equate the expressions for t_1 from both equations:

$$\frac{x_2 - x_1 + t_2 \cdot dx_2}{dx_1} = \frac{y_2 - y_1 + t_2 \cdot dy_2}{dy_1} \tag{5}$$
$$(x_2 - x_1 + t_2 \cdot dx_2) \cdot dy_1 = (y_2 - y_1 + t_2 \cdot dy_2) \cdot dx_1 \tag{6}$$

Expanding and rearranging, we get:

$$x_2 \cdot dy_1 - x_1 \cdot dy_1 + t_2 \cdot dx_2 \cdot dy_1 = y_2 \cdot dx_1 - y_1 \cdot dx_1 + t_2 \cdot dy_2 \cdot dx_1 \tag{7}$$
$$t_2 \cdot (dx_2 \cdot dy_1 - dy_2 \cdot dx_1) = y_2 \cdot dx_1 - y_1 \cdot dx_1 - x_2 \cdot dy_1 + x_1 \cdot dy_1 \tag{8}$$

Solving for t_2:

$$t_2 = \frac{y_2 \cdot dx_1 - y_1 \cdot dx_1 - x_2 \cdot dy_1 + x_1 \cdot dy_1}{dx_2 \cdot dy_1 - dy_2 \cdot dx_1} \tag{9}$$

Substitute t_2 into one of the original equations to find t_1:

$$t_1 = \frac{x_2 \cdot dy_2 - x_1 \cdot dy_2 - y_2 \cdot dx_2 + y_1 \cdot dx_2}{dx_1 \cdot dy_2 - dy_1 \cdot dx_2} \tag{10}$$

Thus, the solutions for t_1 and t_2 are:

$$t_1 = \frac{x_2 \cdot dy_2 - x_1 \cdot dy_2 - y_2 \cdot dx_2 + y_1 \cdot dx_2}{dx_1 \cdot dy_2 - dy_1 \cdot dx_2} \tag{11}$$
$$t_2 = \frac{y_2 \cdot dx_1 - y_1 \cdot dx_1 - x_2 \cdot dy_1 + x_1 \cdot dy_1}{dx_2 \cdot dy_1 - dy_2 \cdot dx_1} \tag{12}$$