

1 Colinear points

Given three points, check whether the three points are colinear or not $p_0(x_0, y_0), p_1(x_1, y_1), p_2(x_2, y_2)$

- 1. find the equation of two points
- 2. substitute the third point to the equation and check whether it is zero or not
- 3. if $f(x, y) = 0$, it is colinear
- 4. if $f(x, y) > 0$, it is on one side
- 5. if $f(x, y) < 0$, it is on other side

$$\begin{aligned} \frac{y-y_0}{x-x_0} &= \frac{y_1-y_0}{x_1-x_0} \\ (y-y_0)(x_1-x_0) &= (x-x_0)(y_1-y_0) \\ f(x,y) &= (y-y_0)(x_1-x_0) - (x-x_0)(y_1-y_0) \end{aligned}$$

(1)

There is one big problem with the solution. The line can not be vertical line since x_1-x_0 can NOT be zero

