The equation of a line is f(x) = A\*x + b = y.

For a segment, it is exactly the same, except that x is included on an interval I. If you have two segments, defined as follow:

Segment1 = {(X1, Y1), (X2, Y2)}

Segment2 = {(X3, Y3), (X4, Y4)}

The abscissa Xa of the potential point of intersection (Xa,Ya) must be contained in both interval I1 and I2, defined as follow :

I1 = [min(X1,X2), max(X1,X2)]

I2 = [min(X3,X4), max(X3,X4)]

And we could say that Xa is included into :

Ia = [max( min(X1,X2), min(X3,X4) ), min( max(X1,X2), max(X3,X4) )]

Now, we need to check that this interval Ia exists :

if (max(X1,X2) < min(X3,X4)):

return False # There is no mutual abcisses

So, we have two line formula, and a mutual interval. Your line formulas are:

f1(x) = A1\*x + b1 = y

f2(x) = A2\*x + b2 = y

As we got two points by segment, we are able to determine A1, A2, b1 and b2:

A1 = (Y1-Y2)/(X1-X2) # Pay attention to not dividing by zero

A2 = (Y3-Y4)/(X3-X4) # Pay attention to not dividing by zero

b1 = Y1-A1\*X1 = Y2-A1\*X2

b2 = Y3-A2\*X3 = Y4-A2\*X4

If the segments are parallel, then A1 == A2 :

if (A1 == A2):

return False # Parallel segments

A point (Xa,Ya) standing on both line must verify both formulas f1 and f2:

Ya = A1 \* Xa + b1

Ya = A2 \* Xa + b2

A1 \* Xa + b1 = A2 \* Xa + b2

Xa = (b2 - b1) / (A1 - A2) # Once again, pay attention to not dividing by zero

The last thing to do is check that Xa is included into Ia:

if ((Xa < max(min(X1,X2), min(X3,X4))) or

(Xa > min(max(X1,X2), max(X3,X4)))):

return False # intersection is out of bound

else:

return True

In addition to this, you may check at startup that two of the four provided points are not equals to avoid all that testing.

References:

<https://stackoverflow.com/questions/3838329/how-can-i-check-if-two-segments-intersect>