

Working with a figure in elementary geometry which is somewhat involved, I needed to mark out some of the more complicated intersection points in the figure. I prefer not to explicitly enter coordinates of intersection points. For this, I leave as much as possible to PGF.

In the attachment file, I give an example (case 1)) where PGF fails to determine the intersection between the right branch of a hyperbola and its real axis.

I also added an example (case 2)) where a circle intersects the hyperbola branch in two different points and in addition, intersects the real axis of the hyperbola. For 2), PGF successfully determines these three intersection points.

So, my question is: Can anybody explain why the case 1) fails?¹

In the attachment file 2, I have given a Latex/PGF code (as short as possible) for the above cases. I have tried my best to document the code to make it as easy as possible (I hope) for others to read and understand.

Any feedback is highly appreciated.

Kent

¹For S the center of the hyperbola, the intersection point in case 1) can be determined as the intersection between the real axis of the hyperbola and a circle with center at S and radius half of the real axis. But, I wanted to test/use the hyperbola path to determine the intersection point in case 1) since this approach applies to more general situations than those covered by intersections between a straight line and a circle.