Was die Wahrscheinlichkeit ist, dass ein Schnittpunkt gut ist.
The Probability that there would be a good Intersection.

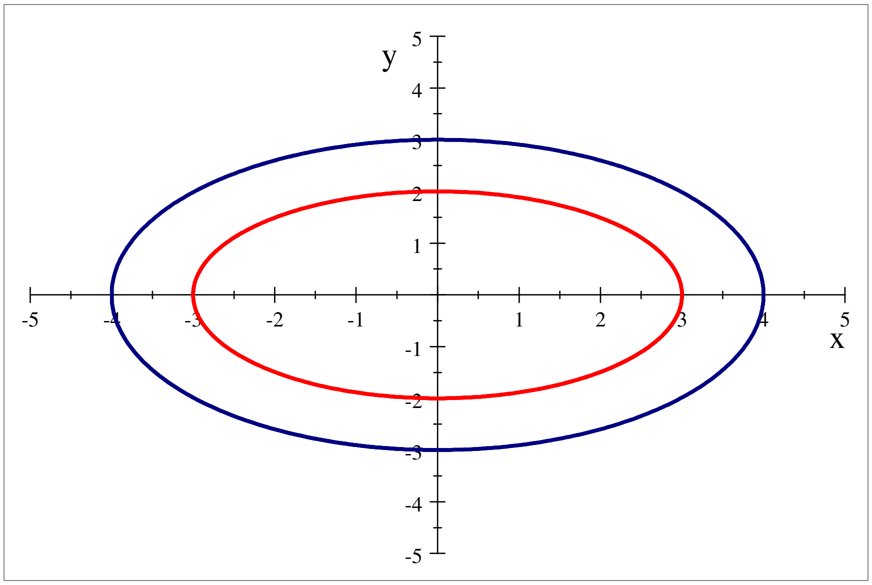
We have two con-centric circles C_1 little with radius r_1, and C_2 big with radius r_2. The line L cuts C_2. What is the probability that it cuts C_1 ?

This L, is determined by the point π (podal point). this is the closest point to the origin and L. $\pi = (r, \vartheta)$ is the polar plot as Rehab, and there is variation from circles to squares and ellipses. Here ϑ is the direction perpendicular to L. As the line L falls, it is random, and $\vartheta \in [0^o, 360^o]$, and r cutting C_2 is uniformly distributed on $[0, r_2]$. Therefore L cuts the little disc if $r < r_1$. The probability that L cuts C_1 and C_2 is $\Pr(L, C_1C_2) = \frac{r_1}{r_2}$. Here the disc C_2 is obtained from C_1 by an homothetic rapport $\frac{r_1}{r_2}$.

We have two squares S_1 and S_2. (one in an other one, con-centric). The probability that L cuts S_1 and S_2 is $\Pr(L, S_1S_2) = \frac{r_1}{r_2}$. This is the same homothetic rapport.

We have two ellipses E_1 and E_2. (one in an other one, con-centric). The probability that L cuts E_1 and E_2 is $\Pr(L, E_1E_2) = \frac{r_1}{r_2}$. This is the same homothetic rapport. Here the quotient of the lengths (abscissa and coordiantes are not symetric) are quotients of perimeters with $\Pr(L, E_1E_2) = \frac{per(E_1)}{per(E_2)}$. Here L joins a $\vartheta \in [0^o, 360^o]$, has the probability that one line perpendicular to this direction cuts E_1 that also cuts E_2 is the homothetic rapport.

A Workshop example for the ellipses E_1 and E_2 is plotted. The graph of $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ with $a^2 > b^2$ is an ellipse with top points $(0, \pm a)$, and end points $(\pm b, 0)$. The foci are $(0, \pm c)$ with $c^2 = a^2 - b^2$. The eccentricity is defined as $e = \frac{c}{a} = \frac{\sqrt{a^2-b^2}}{a}$. We expect an emissary to travel on th perimeter with period 76,2 hours as period, with eccentricity $e = 0.967$. The analysis sets a point in the ellipse (in the sky it is the Sun) that is the object of the exercice (near the one of the focus) and the *distance from that point to the closest point* on the ellipse is 0.587 units. The point is say $(-2; 0)$ (the Sun). We want *the biggest distance form the point of the Sun*. We look for the c is the distance from $(0; 0)$ to $(-2; 0)$, and $2a$ is the length from $(-3; 0)$ to $(0; 0)$, that is 3. We know that the minimum distance $a - c$ in between the point that is the Sun, namely $(-2; 0)$ and the point travelling on the perimeter is $a - c = 0.587$. $e = \frac{c}{a} = 0.967$, implying $c = 0.967a = 0.967(c + 0.587) = 0.967c + 0.568$. $c = 17.2$. The biggest distance is $a + c = 35$, is the distance we looked for.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