$$dg = \frac{G \cdot dm \cdot \cos(\alpha)}{r^2} \qquad dm := 1 \qquad \alpha := 0, \frac{\pi}{500} .. \frac{\pi}{2} \qquad \beta := 0, \frac{\pi}{100} .. 2 \cdot \pi$$

$$r^2 = \frac{G \cdot dm \cdot \cos(\alpha)}{dg}$$

bijdrage in x richting per deeltje dm op afstand r moet dg= constant blijven

$$\frac{G \cdot dm}{dg} = \frac{\cos(\alpha)}{r^2}$$

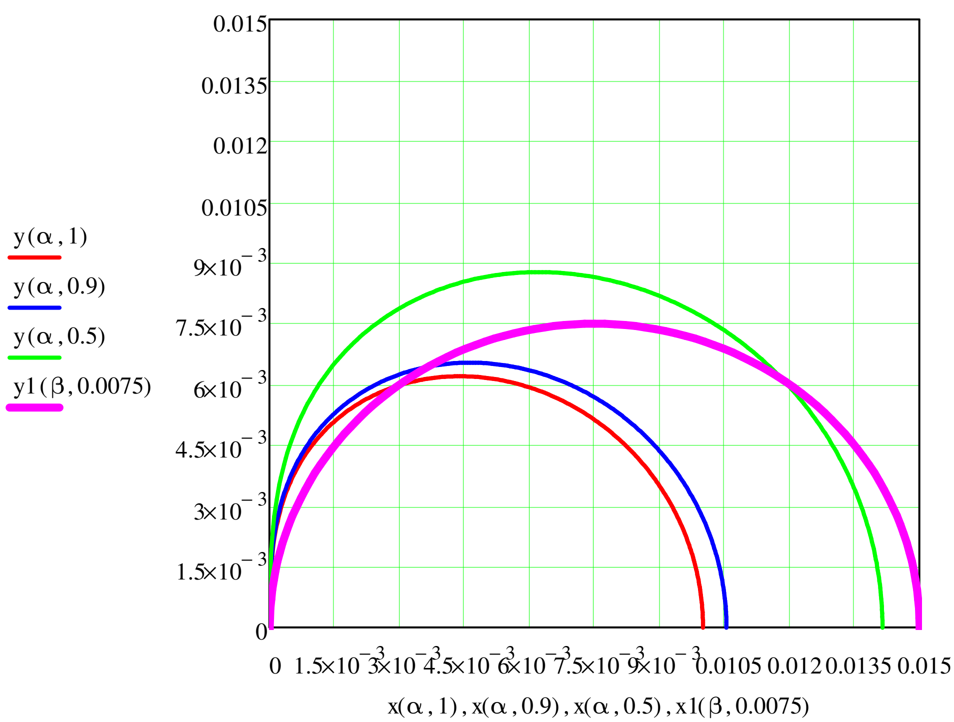
$$r(\alpha, dg) := \sqrt{\frac{G \cdot dm}{dg}} \cdot \sqrt{\cos(\alpha)} \qquad x(\alpha, dg) := \sqrt{\frac{G \cdot dm}{dg}} \cdot \sqrt{\cos(\alpha)} \cdot \cos(\alpha)$$

$$y(\alpha, dg) := \sqrt{\frac{G \cdot dm}{dg}} \cdot \sqrt{\cos(\alpha)} \cdot \sin(\alpha)$$

$$x1(\beta, r) := r \cdot (1 + \cos(\beta))$$

cirkel met straal r

$$y1(\beta, r) := r \cdot \sin(\beta)$$



$$x(\alpha, k1) := k1\cdot\sqrt{\cos(\alpha)}\cdot\cos(\alpha)$$

$$y(\alpha, k1) := k1\cdot\sqrt{\cos(\alpha)}\cdot\sin(\alpha)$$

$x(0,1) = 1$ $y(0,1) = 0$ $x\left(\frac{\pi}{2}, 1\right) = 0$ $y\left(\frac{\pi}{2}, 1\right) = 7.825\times 10^{-9}$

$$\text{Volume} := \int_0^1 \pi\cdot y^2\, dx$$

$$x = k1\cdot\sqrt{\cos(\alpha)}\cdot\cos(\alpha)$$

$$\frac{d}{d\alpha}x = k1\cdot\left(-\sin(\alpha)\cdot\sqrt{\cos(\alpha)} + \cos(\alpha)\cdot\frac{1}{2}\cdot\cos(\alpha)^{\frac{-1}{2}}\cdot -\sin(\alpha)\right)$$

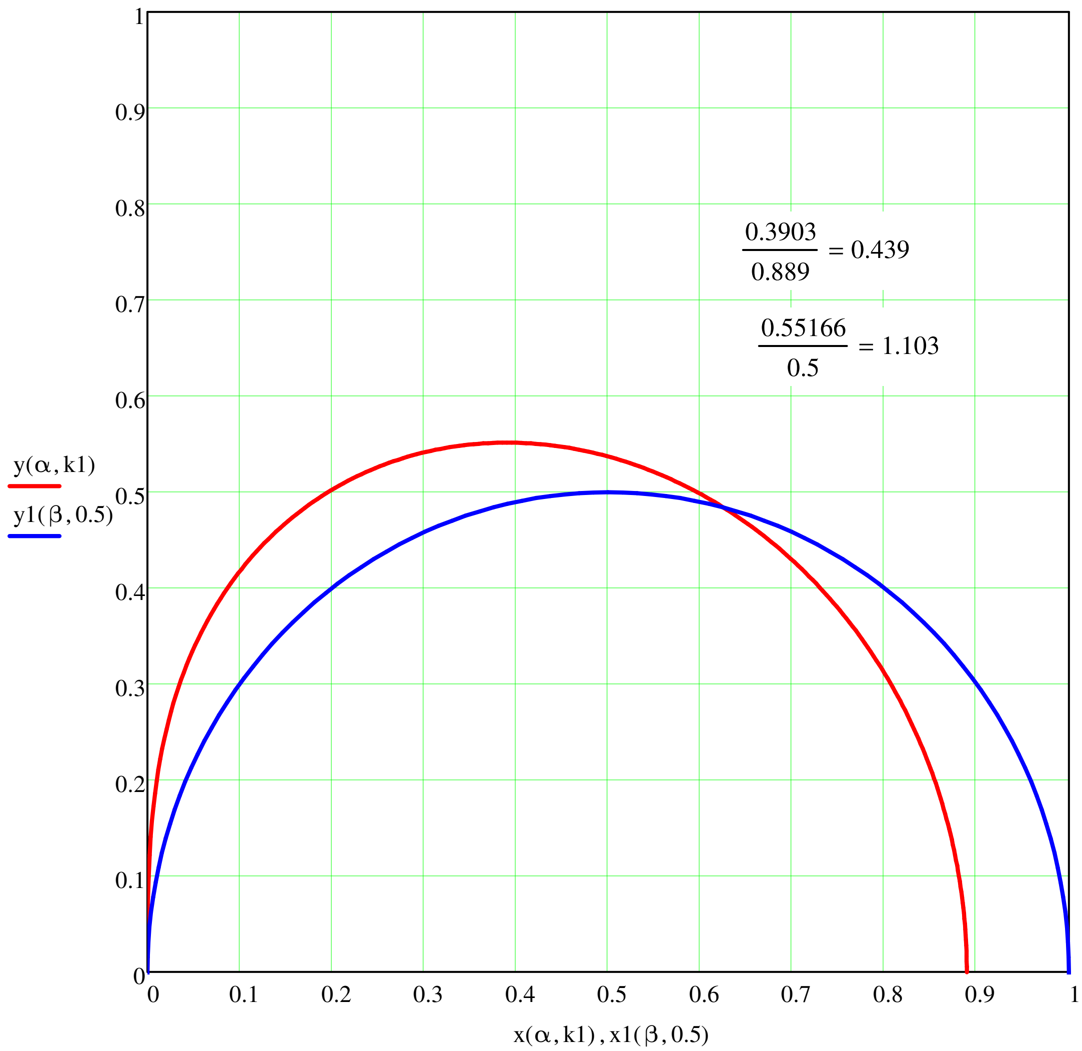
$$k1\cdot\left(-\sin(\alpha)\cdot\sqrt{\cos(\alpha)} + \cos(\alpha)\cdot\frac{1}{2}\cdot\cos(\alpha)^{\frac{-1}{2}}\cdot -\sin(\alpha)\right)$$

$$-k1\cdot\sin(\alpha)\cdot\left(\sqrt{\cos(\alpha)} + \frac{1}{2}\cdot\frac{\cos(\alpha)}{\sqrt{\cos(\alpha)}}\right)$$

$$\text{Volume}(k1) := \int_{\frac{\pi}{2}}^{0} \pi\cdot\left(k1^2\cdot\sqrt{\cos(\alpha)}\cdot\sin(\alpha)\right)^2\cdot\left[-\sin(\alpha)\cdot\left(\sqrt{\cos(\alpha)} + \frac{1}{2}\cdot\frac{\cos(\alpha)}{\sqrt{\cos(\alpha)}}\right)\right] d\alpha$$

$k1 := 0.8892$

$\text{Volume}(k1) = 0.524$ $r := 0.5$ $\frac{4}{3}\cdot\pi\cdot r^3 = 0.524$



y(α, k1)
y1(β, 0.5)
x(α, k1), x1(β, 0.5)
0.3903 / 0.889 = 0.439
0.55166 / 0.5 = 1.103
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1