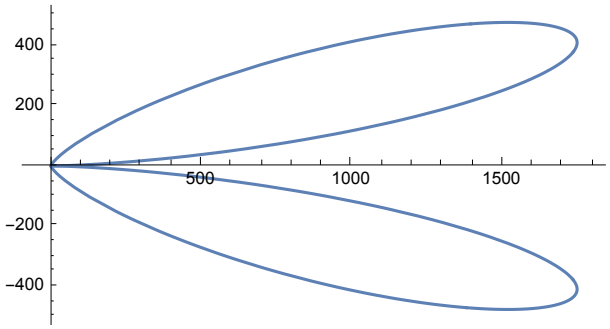
$$J[\beta\_, \theta\_, \phi\_] := \frac{\text{Sin}[\theta]^2}{(1 - \beta\,\text{Cos}[\theta])^5}$$

$$JJ[\beta\_, \theta\_] := \frac{1}{(1 - \beta\,\text{Cos}[\theta])^3}\left(1 - \frac{\left(1 - \beta^2\right)\text{Sin}[\theta]^2}{(1 - \beta\,\text{Cos}[\theta])^2}\right)$$

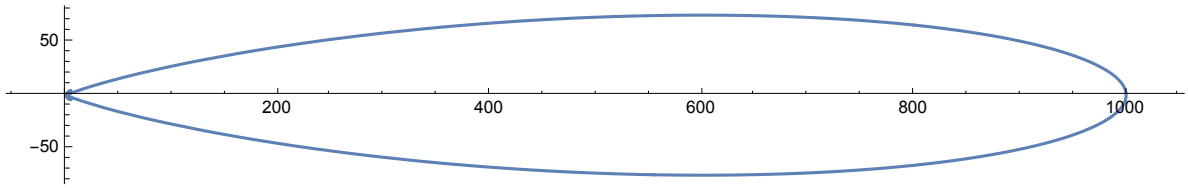
$$x[\beta\_, \theta\_] := \frac{\text{Sin}[\theta]^2}{(1 - \beta\,\text{Cos}[\theta])^5}\,\text{Cos}[\theta]$$

$$z[\beta\_, \theta\_] := \frac{\text{Sin}[\theta]^2}{(1 - \beta\,\text{Cos}[\theta])^5}\,\text{Sin}[\theta]$$

```
"ACELERACIÓN PARALELA A LA VELOCIDAD"; β = 0.9;

ParametricPlot[{x[0.9, θ], z[0.9, θ]}, {θ, -π / 2, π / 2}]
```




```
x1[β_, θ_] := JJ[β, θ] Cos[θ]

z1[β_, θ_] := JJ[β, θ] Sin[θ]

"ACELERACIÓN PERPENDICULAR A LA VELOCIDAD" β = 0.9;
ParametricPlot[{x1[0.9, θ], z1[0.9, θ]}, {θ, -π, π}, PlotRange → Full]
```




```
ParametricPlot[{x1[0.95, θ], z1[0.95, θ]},
 {θ, -π, π}, PlotRange → {{-1, 50}, {-25, 25}}]
```