

## PARABOLA

Obtencion de posicion y velocidad a aprtir de elementos orbitales.  
Curso Mecanica Celeste 2005. Tabare Gallardo.

unidad de tiempo = dia  
unidad de distancia = ua  
unidad de masa = sol

```
M := 1.0  
m := 0.0009548  
kgauss := 0.01720209895  
 $\mu := \text{kgauss} * \text{kgauss} * (M + m)$   
q := 5.179995814935037  
e := 1.0  
i := 1.3046833201072958 * Pi / 180  
 $\omega := -84.90588389067327 * \text{Pi} / 180$   
 $\Omega := 100.48313071118518 * \text{Pi} / 180$   
T := -81.299453540603  
t := -83.0
```

$$n := \sqrt{\frac{\mu}{2 * q^3}}$$

$$p := 2 * q$$
$$h := \sqrt{p * \mu}$$

$$AM := n * (t - T)$$

```

paramp := 3
paramq := -3 * AM
paramD := 1 + (paramq / 2)2
paramu :=

$$\sqrt[3]{\text{Abs}[-\text{paramq} / 2 + \sqrt{\text{paramD}}] * \text{Sign}[-\text{paramq} / 2 + \sqrt{\text{paramD}}]}$$

paramv := 
$$\sqrt[3]{\text{Abs}[-\text{paramq} / 2 - \sqrt{\text{paramD}}] * \text{Sign}[-\text{paramq} / 2 - \sqrt{\text{paramD}}]}$$

solu := paramu + paramv

```

- General::spell1 : Possible spelling error: new symbol name "paramq" is similar to existing symbol "paramp". More...
- General::spell : Possible spelling error: new symbol name "paramu" is similar to existing symbols {paramp, paramq}. More...
- General::spell : Possible spelling error: new symbol name "paramv" is similar to existing symbols {paramp, paramq, paramu}. More...

```

θ := 2 * ArcTan[solu]

```

```

r := 
$$\frac{p}{1 + \text{Cos}[\theta]}$$


```

```

ξ := r * Cos[θ]
η := r * Sin[θ]
ξ := 0

```

```

vecpos := {ξ, η, ξ}

```

```

xp := -h / p * Sin[θ]
yp := h / p * (e + Cos[θ])
zp := 0

```

```

vecvel := {xp, yp, zp}

```

```

P1 = {{Cos[ω], -Sin[ω], 0}, {Sin[ω], Cos[ω], 0}, {0, 0, 1}};

```

```
P2={{1,0,0},{0,Cos[i],-Sin[i]},{0,Sin[i],Cos[i]}};
```

```
P3={{Cos[Ω],-Sin[Ω],0},{Sin[Ω],Cos[Ω],0},{0,0,1}};
```

```
P=P3.P2.P1;
```

```
veclipos = P.vecpos
```

```
{4.99328, 1.37326, -0.117514}
```

```
veclivel = P.vecvel
```

```
{-0.0028534, 0.0103062, 0.0000211943}
```

```
{r, θ}
```

```
{5.18001, -0.00351073}
```