```
(%i1)  kill(all);
(%o0)  done
```

1 Eq.(6)

```
(%i1)  v2: c^2/(2*%pi)*Dphi;
```

$$(v2)\quad \frac{Dphi\ c^2}{2\ \pi}$$

```
(%i6)  c: 2.99792458e8;
       G: 6.67384e-11;
       m[1]: m[2]: 2.804e30;
       alpha: 5.3671e8;
       epsilon: 0.6171334;
```

$$(c)\quad 2.99792458\ 10^{8}$$

$$(G)\quad 6.67384\ 10^{-11}$$

$$(\%o4)\quad 2.804\ 10^{30}$$

$$(alpha)\quad 5.3671\ 10^{8}$$

$$(epsilon)\quad 0.6171334$$

```
(%i7)  Dphi: 6.526e-5;
```

$$(Dphi)\quad 6.526\ 10^{-5}$$

1.1 v^2 and v

```
(%i9)  v2a: ev(v2), numer;
       va: sqrt(v2a);
```

$$(v2a)\quad 9.334877151775893\ 10^{11}$$

$$(va)\quad 966171.6799707955$$

2 Eq.(10/15)

```
(%i10)  vN2: k/mu*(2/r-1/a);
```

$$(vN2)\quad \frac{k\left(\frac{2}{r}-\frac{1}{a}\right)}{\mu}$$

```
(%i11)  k: m[1]*m[2]*G;
```

$$(k)\quad 5.247250639744\ 10^{50}$$

```
(%i12)  mu: m[1]*m[2]/(m[1]+m[2]);
```

$$(mu)\quad 1.402\ 10^{30}$$

```
(%i13)  r: alpha/(1+epsilon);
```

$$(r)\quad 3.318897500973018\ 10^{8}$$

```
(%i14)  a: alpha/(1-epsilon^2);
```

$$(a)\quad 8.668548003333324\ 10^{8}$$

```
(%i15)  vN2a: ev(vN2);
```

$$(vN2a)\quad 1.823626113558839\ 10^{12}$$

```
(%i16)  vNa: sqrt(vN2a);
```

$$(vNa)\quad 1350417.014687996$$

3 Eq.(17)

v > vN, positive line element

```
(%i17)  Vtheta2: vN2a-v2a;
```

$$(Vtheta2)\quad 8.901383983812493\ 10^{11}$$