

```
1: program EDO2EULER
2: parameter (NNN = 100000)
3: implicit real*8 (a-h,o-z)
4: parameter (PI = ACOS(-1.0))
5: real*8 DIFF, EXATA, X
6: dimension Y(0:NNN)
7: dimension Z(0:NNN)
8: open(14, file="dados-Verlet-20do03exe01.txt")
9: open(15, file="erro-Verlet-20do03exe01.txt")
10: H = 0.001d0
11: NSTEP = int(10.d0/H)
12: Y(0) = 1.d0
13: Z(0) = 0.d0
14: do 10 IX = 0, NSTEP-1
15:   X = IX*H
16:   Y(IX+1) = Y(IX) + H*Z(IX) + 0.5d0*H**2*FUNC(X, Y(IX))
17:   Z(IX+1) = Z(IX) - H*Y(IX)
18:   DIFF = EXATA(X+H) - Y(IX+1)
19:   erro = dabs(DIFF/EXATA(X+H))
20:   write(14, *) X+H, Y(IX+1), EXATA(X+H)
21:   write(15, *) erro
22: 10 continue
23: end
24:
25: real*8 function FUNC(X, Y)
26:   implicit real*8 (a-h,o-z)
27:   FUNC = -Y
28: end
29:
30: real*8 function exata(x)
31:   implicit real*8 (a-h,o-z)
32:   exata = dcos(x)
33: end
```