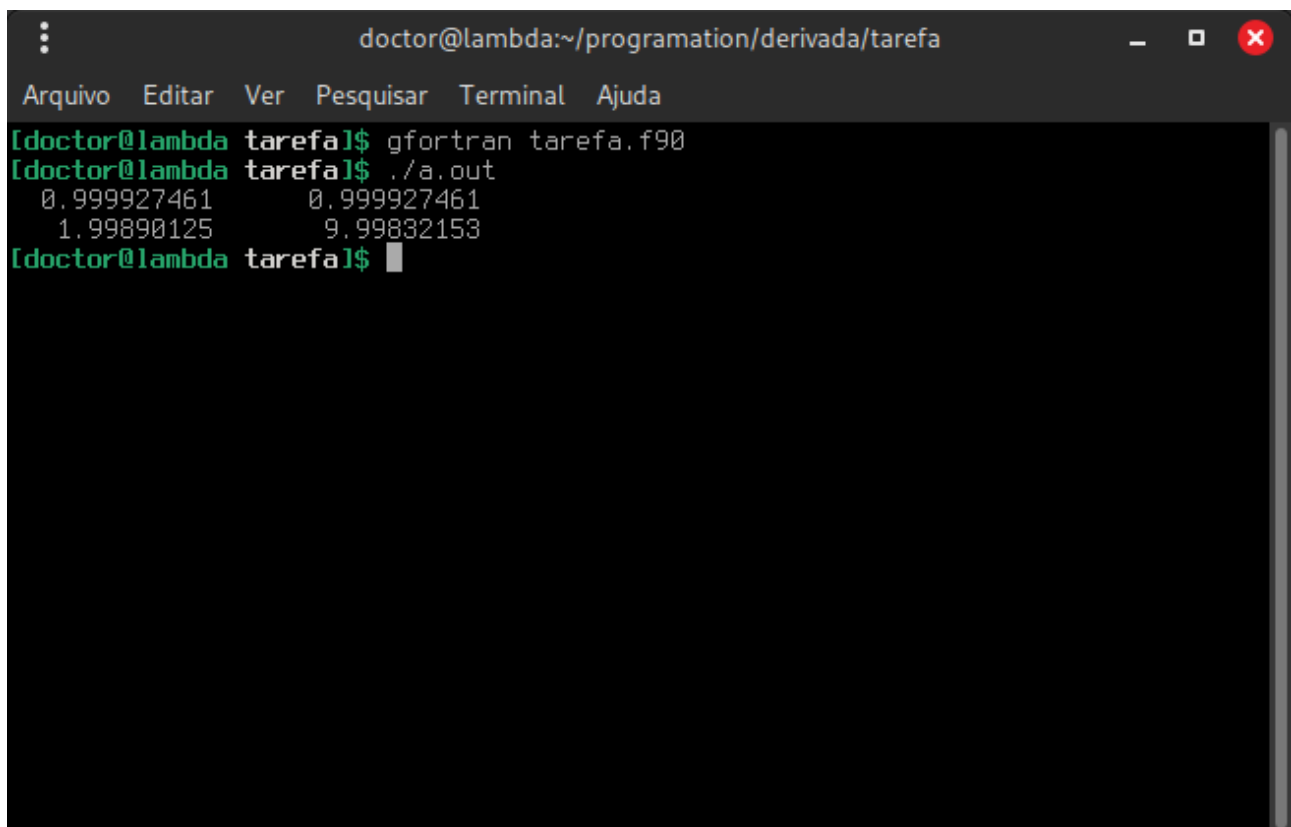# Tarefa - MTF

Alfredo Pacheco

```fortran
 1 program matriz_jacobiana
 2     implicit none
 3     real :: x,y,h,f1,f2
 4     real, dimension(2,2) :: jacob
 5     integer :: i,j
 6
 7     x = 1.0
 8     y = 5.0
 9     h = 0.001
10
11     do i = 1,2
12         do j = 1,2
13             call handler(i,j)
14         end do
15     end do
16
17     do i=1,2
18         write(*,*) (jacob(i,j), j=1 ,2)
19     end do
20
21 CONTAINS
22 subroutine handler(j1,j2)
23     implicit none
24     real :: der_x,der_y
25     integer :: j1,j2
26     external der_x,der_y
27
28     if(j1 == 1) then
29         if(j2 == 1) then
30             jacob(j1,j2) = der_x(x,y,h,1)
31         else if (j2 == 2) then
32             jacob(j1,j2) = der_y(x,y,h,1)
33         end if
34     else if(j1 == 2) then
35         if(j2 == 1) then
36             jacob(j1,j2) = der_x(x,y,h,2)
37         else if (j2 == 2) then
38             jacob(j1,j2) = der_y(x,y,h,2)
39         end if
40     end if
41 end subroutine
42
43 end program matriz_jacobiana
44
45
```

```fortran
46 real function der_x(x,y,h,choser)
47     implicit none
48     real :: x,y,h,f1,f2
49     integer :: choser
50     external f1,f2
51
52     if(choser == 1) der_x = (f1(x,y) - f1(x-h,y))/h
53     if(choser == 2) der_x = (f2(x,y) - f2(x-h,y))/h
54
55 end function
56
57 real function der_y(x,y,h,choser)
58     implicit none
59     real :: x,y,h,f1,f2
60     integer :: choser
61     external f1,f2
62
63     if(choser == 1) der_y = (f1(x,y) - f1(x,y-h))/h
64     if(choser == 2) der_y = (f2(x,y) - f2(x,y-h))/h
65
66 end function
67
68
69 real function f1(x,y)
70     implicit none
71     real :: x,y
72
73     f1 = x + y -3
74 end function
75
76 real function f2(x,y)
77     implicit none
78     real :: x,y
79
80     f2 = x**2 + y**2 - 9
81 end function
```

Figura 1: Print do terminal com a execução do código.