Integrace-sfericke souradnice

```
>
> with(linalg):
> with(student):
> with(plots):
>
>
> F:=(x,y,z)-> z:
> assume(R>0):
> M:= [x^2 + y^2 + z^2 < R^2,x^2+y^2<1]:
> X:=(r,f,t) ->r*cos(f)*cos(t):
> Y:=(r,f,t) ->r*sin(f)*cos(t):
> Z:=(r,f,t) ->r*sin(t):
> V:=[r*cos(f)*cos(t),r*sin(f)*cos(t),r*sin(t)]:
> J:=simplify(det(jacobian(V,[r,f,t]))):
>
>
> MM:=simplify(subs(x=X(r,f,t),y=Y(r,f,t),z=Z(r,f,t),M));
```

$$MM := [r^2 < R\sim^2, r^2 \cos(t)^2 < 1]$$

```
> FF:=simplify(subs(x=X(r,f,t),y=Y(r,f,t),z=Z(r,f,t),F(x,y,z)));
```

$$FF := r \sin(t)$$

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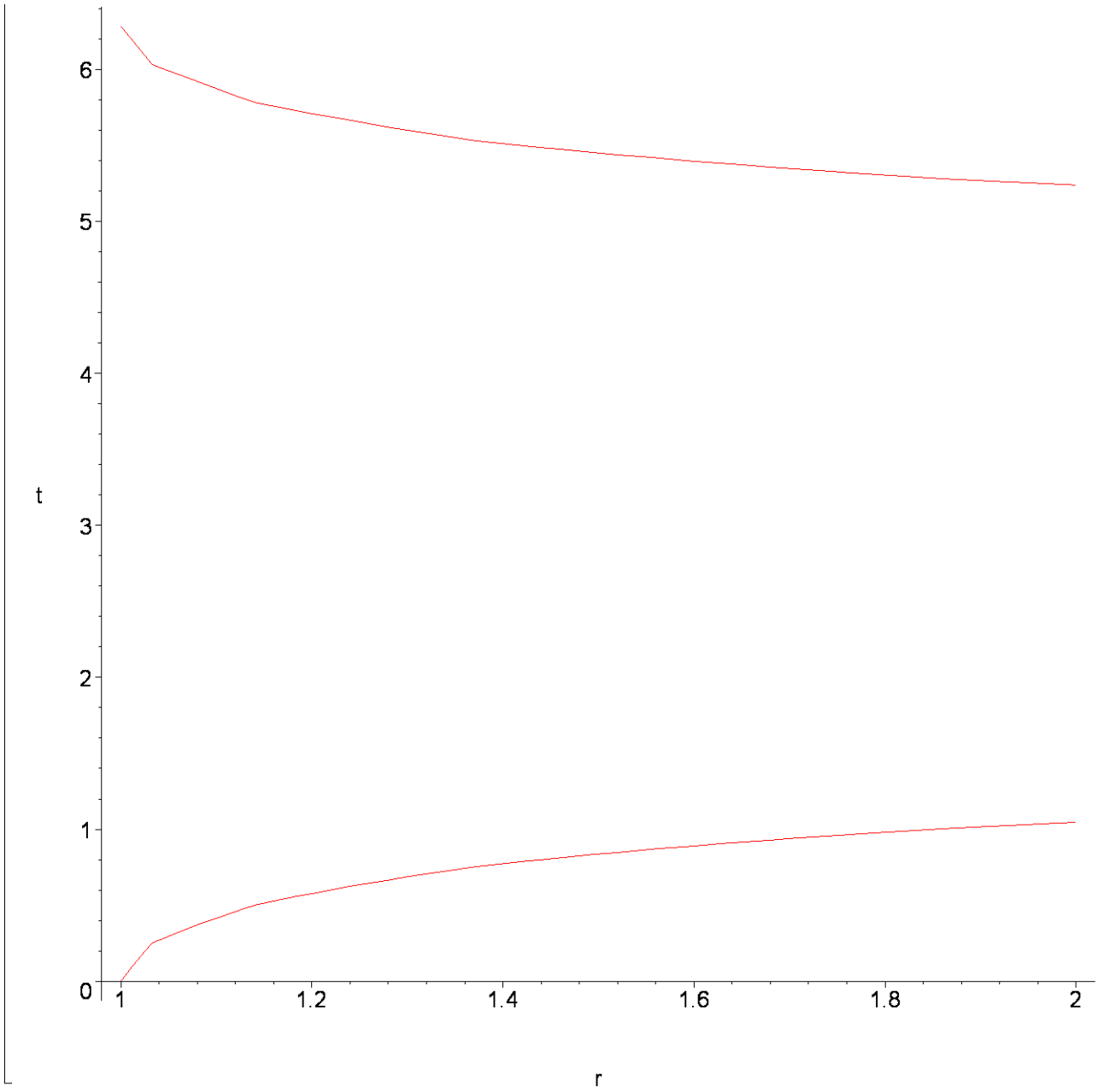
>
> vysl:=int(int(int(FF*abs(J), r=0..R),  f=0..2*Pi), t=0..Pi/2);
```

$$vysl := \frac{R\sim^4 \pi}{4}$$

```
>
> implicitplot(r*cos(t) = 1,r=0..2,t=0..2*Pi);
```


t
r
0
1
2
3
4
5
6
1
1.2
1.4
1.6
1.8
2

>
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