A

```
> restart: with(plots): with(plottools):
> Jacobi2d:=(r)->LinearAlgebra[Determinant](<diff~(r(u,v)[1],u),
  diff~(r(u,v)[2],u)|diff~(r(u,v)[1],v),diff~(r(u,v)[2],v)>):
  Jacobi3d:=(r)->expand(simplify(LinearAlgebra[Norm](LinearAlgebra
  [CrossProduct](<diff~(r(u,v)[1],u),diff~(r(u,v)[2],u),diff~(r(u,
  v)[3],u)>,<diff~(r(u,v)[1],v),diff~(r(u,v)[2],v),diff~(r(u,v)[3],
  v)>),2)assuming 0<u)):
  JacobiRum:=(r)->LinearAlgebra[Determinant](<diff~(r(u,v,w)[1],u),
  diff~(r(u,v,w)[2],u),diff~(r(u,v,w)[3],u)|diff~(r(u,v,w)[1],v),
  diff~(r(u,v,w)[2],v),diff~(r(u,v,w)[3],v)|diff~(r(u,v,w)[1],w),
  diff~(r(u,v,w)[2],w),diff~(r(u,v,w)[3],w)>):
> hoved:=plot3d(<7.68*cos(v),7.68*sin(v),u>,u=0..34.8,v=0..2*Pi,
  color=gold):
> top:=plot3d(<3*cos(v),3*sin(v),u>,u=34.9..34.9+4,v=0..2*Pi,color=
  aquamarine):
> skive:=plot3d(<u*cos(v),u*sin(v),34.9>,u=3..7.68,v=0..2*Pi,color=
  khaki):
> obs:=plot3d(<sin(u)*3*cos(v),sin(u)*3*sin(v),cos(u)*3+34.8+4>,u=
  0..Pi/2,v=0..2*Pi,color=green):
> display(hoved,top,skive,obs,view=[-10..10,-10..10,0..50],scaling=
  constrained):
```

B

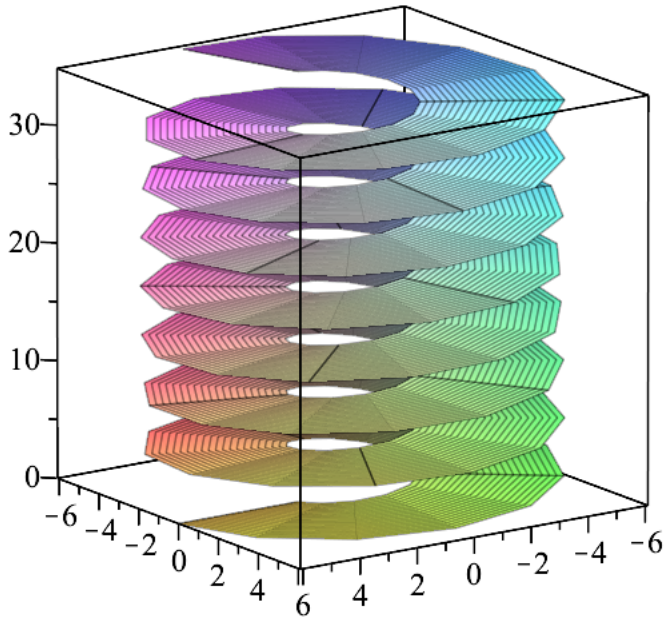
```
> faktor:=solve(7.8*(2*Pi)/x=34.8)
```

$$faktor := 1.408300155 \tag{2.1}$$

```
> r:=(u,v)->(u*cos(v*faktor),u*sin(v*faktor),v):
> r(u,v)
```

$$u\cos(1.408300155\,v),\ u\sin(1.408300155\,v),\ v \tag{2.2}$$

```
> plot3d(<r(u,v)[1],r(u,v)[2],r(u,v)[3]>,u=1.95..6.10,v=0..34.8,
  numpoints=10000)
```




```
> Jacobi3d(r):
> areal=int(Jacobi3d(r),u=1.95..6.10,v=0..34.8)
```

$$areal = 832.5447496 \tag{2.3}$$

C

```
> with(LinearAlgebra):
> s:=v->(3*cos(v*faktor),3*sin(v*faktor),v)
```

$$s := v \mapsto (3\cdot\cos(v\cdot faktor), 3\cdot\sin(v\cdot faktor), v) \quad \textbf{(3.1)}$$

```
> diff(s(v)[1],v)
```

$$-4.224900465\,\sin(1.408300155\,v) \quad \textbf{(3.2)}$$

```
> K:=sqrt((diff(s(v)[1],v))^2+(diff(s(v)[2],v))^2+(diff(s(v)[3],v))
  ^2)
```

$$K := \sqrt{17.84978394\,\sin(1.408300155\,v)^2 + 17.84978394\,\cos(1.408300155\,v)^2 + 1} \quad \textbf{(3.3)}$$

```
> simplify(K(v))
```

$$\sqrt{17.84978394\,\sin(1.408300155\,v)\,(v)^2 + 17.84978394\,\cos(1.408300155\,v)\,(v)^2 + 1.} \quad \textbf{(3.4)}$$

```
> længde:=int(K,v=0..34.8)
```

$$længde := 151.0888558 \quad \textbf{(3.5)}$$

```
> fundet_stigning:=34.8/længde
```

$$fundet\_stigning := 0.2303280399 \quad \textbf{(3.6)}$$

```
> 0.33+0.10:
  rigtig_stigning := %/2
```

$$rigtig\_stigning := 0.2150000000 \quad \textbf{(3.7)}$$

```
> forskel=fundet_stigning/rigtig_stigning
```

$$forskel = 1.071293209 \quad \textbf{(3.8)}$$

D

```
> f:=x->a*x+b
```

$$f := x \mapsto a \cdot x + b \tag{4.1}$$

```
> b:=0.5
```

$$b := 0.5 \tag{4.2}$$

```
> f(34.8)=0.4
```

$$34.8\, a + 0.5 = 0.4 \tag{4.3}$$

```
> solve(f(34.8)=0.4,{a})
```

$$\{a = -0.002873563218\} \tag{4.4}$$

```
> h:=z->(subs((4.4),f(z))):
  h(z)
```

$$-0.002873563218\, z + 0.5 \tag{4.5}$$

```
> g:=(u,v,w)-><r(u,v)[1],r(u,v)[2],r(u,v)[3]+h(v)*w>:
> g(u,v,w)
```

$$\begin{bmatrix} u \cos(1.408300155\, v) \\ u \sin(1.408300155\, v) \\ v + (-0.002873563218\, v + 0.5)\, w \end{bmatrix} \tag{4.6}$$

```
> rumfang=int(abs(JacobiRum(g)),u=1.95..6.10,v=0..34.8,w=0..1)
```

$$rumfang = 368.3841756 \tag{4.7}$$

```
> masse:=2*%
```

$$masse := 2\, rumfang = 736.7683512 \tag{4.8}$$

```
> forskel=masse/5914
```

$$forskel = \left(\frac{rumfang}{2957} = 0.1245803773 \right) \tag{4.9}$$