```
> restart;
```
```
> # Answers to Quiz 5 problem 3
```
```
> f:=int(cos(x^2),x=0..t);
  g:=int(sin(x^2),x=0..t);
  df:=diff(f,t);
  dg:=diff(g,t);
```
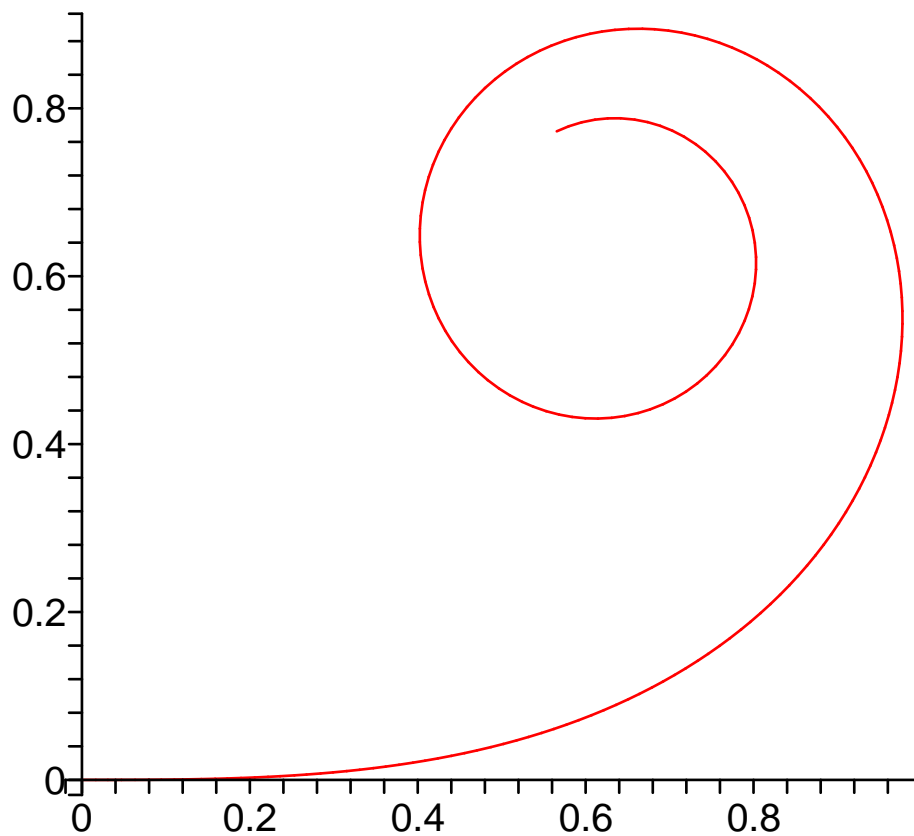
$$f := \frac{1}{2} \sqrt{2} \sqrt{\pi} \; \text{FresnelC}\left(\frac{\sqrt{2} \; t}{\sqrt{\pi}}\right)$$

$$g := \frac{1}{2} \sqrt{2} \sqrt{\pi} \; \text{FresnelS}\left(\frac{\sqrt{2} \; t}{\sqrt{\pi}}\right)$$
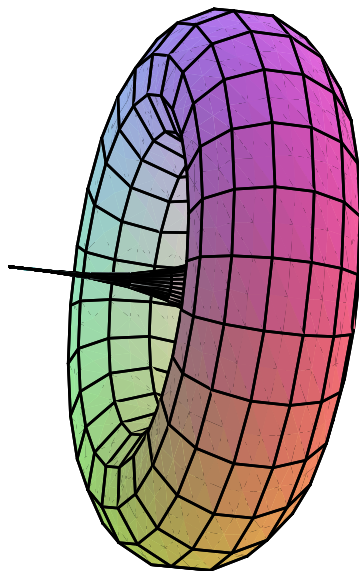
$$df := \cos(t^2)$$

$$dg := \sin(t^2)$$

```
> plot([f,g,t=0..Pi],scaling=constrained,numpoints=200);
```

```
> L:=int(sqrt(df^2+dg^2),t=0..Pi);
```
$$L := \pi$$

```
> plot3d([f,cos(theta)*g,sin(theta)*g],
        theta=0..2*Pi,t=0..Pi,scaling=constrained);
```
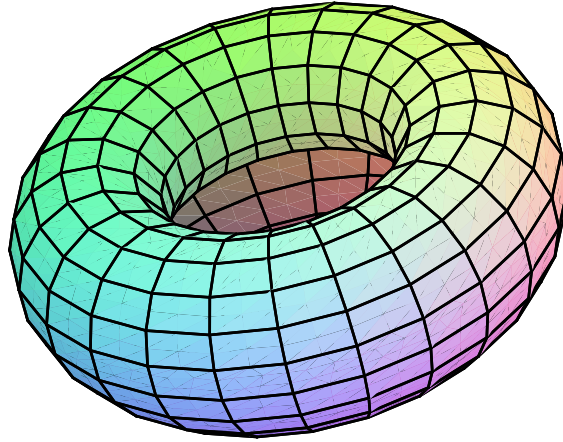


```
> Ax:=int(2*Pi*g*sqrt(df^2+dg^2),t=0..Pi);
```
$$Ax := -\pi + \pi^{(5/2)} \sqrt{2} \ \text{FresnelS}(\sqrt{2} \ \sqrt{\pi}) + \cos(\pi^2) \pi$$

```
> evalf(Ax);
```
$$9.274071142$$

```
> plot3d([cos(theta)*f,g,sin(theta)*f],
        theta=0..2*Pi,t=0..Pi,scaling=constrained);
```

```
> Ay:=int(2*Pi*f*sqrt(df^2+dg^2),t=0..Pi);
```

$$Ay := \pi^{(5/2)} \sqrt{2} \ \text{FresnelC}(\sqrt{2} \ \sqrt{\pi}) - \sin(\pi^2) \ \pi$$

```
> evalf(Ay);
```

$$12.51817355$$

```
>
```