In[1]:=
```
ClearAll["Global`*"]
```

```
x = Sin[θ[t]] Cos[ϕ[t]];
y = Sin[θ[t]] Sin[ϕ[t]];
z = Cos[θ[t]];
FullSimplify[D[x, t]^2 + D[y, t]^2 + D[z, t]^2]
```

Out[5]=
$$\theta'[t]^2 + \text{Sin}[\theta[t]]^2\, \phi'[t]^2$$

In[6]:=
```
ClearAll["Global`*"]
```

```
x = r[t] Cos[θ[t]];
y = r[t] Sin[θ[t]];
z = Sqrt[1 - r[t]^2] ;
FullSimplify[D[x, t]^2 + D[y, t]^2 + D[z, t]^2]
```

Out[10]=
$$-\frac{r'[t]^2}{-1 + r[t]^2} + r[t]^2\, \theta'[t]^2$$