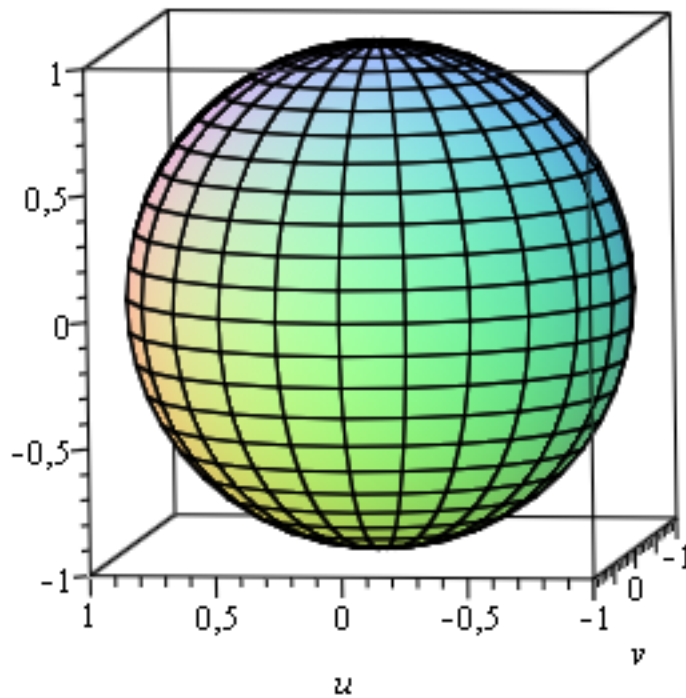


```

> restart: with(LinearAlgebra): with(plots):
> f := Vector([cos(u)*cos(v), cos(u)*sin(v), sin(u)]):
> plot3d(f, u=-Pi/2..Pi/2, v = 0..2*Pi, scaling = constrained,
axes=boxed);

```



```

> fu := map(diff, f, u); fv := map(diff, f, v);

```

$$fu := \begin{bmatrix} -\sin(u) \cos(v) \\ -\sin(u) \sin(v) \\ \cos(u) \end{bmatrix}$$

$$fv := \begin{bmatrix} -\cos(u) \sin(v) \\ \cos(u) \cos(v) \\ 0 \end{bmatrix}$$

(1)

```

> n := factor(CrossProduct(fu, fv));

```

(2)

$$n := \begin{bmatrix} -\cos(u)^2 \cos(v) \\ -\cos(u)^2 \sin(v) \\ -\sin(u) \cos(v)^2 \cos(u) - \sin(u) \sin(v)^2 \cos(u) \end{bmatrix} \quad (2)$$

$$\begin{aligned} &> \text{solve}(\{n[1], n[2], n[3]\}, \{u, v\}); \\ &\quad \left\{ u = \frac{1}{2} \pi, v = v \right\}, \left\{ u = \frac{1}{2} \pi, v = v \right\} \end{aligned} \quad (3)$$