$$\boldsymbol{x} = u\cos\left(v\right)\boldsymbol{e_x} + u\sin\left(v\right)\boldsymbol{e_y} + \left(u\cos\left(v\right) + w\right)\boldsymbol{e_z}$$

$$\boldsymbol{x}_u = \cos\left(v\right)\boldsymbol{e_x} + \sin\left(v\right)\boldsymbol{e_y} + \cos\left(v\right)\boldsymbol{e_z}$$

$$\boldsymbol{x}_v = -u\sin\left(v\right)\boldsymbol{e_x} + u\cos\left(v\right)\boldsymbol{e_y} - u\sin\left(v\right)\boldsymbol{e_z}$$

$$\boldsymbol{x}_w = \boldsymbol{e_z}$$

$$\boldsymbol{x}^u = \cos\left(v\right)\boldsymbol{e_x} + \sin\left(v\right)\boldsymbol{e_y}$$

$$\boldsymbol{x}^v = -\frac{\sin\left(v\right)}{u}\boldsymbol{e_x} + \frac{\cos\left(v\right)}{u}\boldsymbol{e_y}$$

$$\boldsymbol{x}^w = -\boldsymbol{e_x} + \boldsymbol{e_z}$$