

In[2]:= **eNext = {x, y, z}**

Out[2]= {x, y, z}

In[3]:= **tNext = {x, y, z} / Sqrt[x\*x+y\*y+z\*z]**

Out[3]=  $\left\{ \frac{x}{\sqrt{x^2 + y^2 + z^2}}, \frac{y}{\sqrt{x^2 + y^2 + z^2}}, \frac{z}{\sqrt{x^2 + y^2 + z^2}} \right\}$

In[4]:= **tPrev = {a, b, c}**

Out[4]= {a, b, c}

In[5]:= **d = {d1, d2, d3}**

Out[5]= {d1, d2, d3}

In[6]:= **chi = Simplify[1 + Dot[tPrev, tNext]]**

Out[6]= 
$$\frac{a x + b y + c z + \sqrt{x^2 + y^2 + z^2}}{\sqrt{x^2 + y^2 + z^2}}$$

In[7]:= **tTilde = (tPrev + tNext) / chi**

Out[7]= 
$$\left\{ \frac{\sqrt{x^2 + y^2 + z^2} \left( a + \frac{x}{\sqrt{x^2 + y^2 + z^2}} \right)}{a x + b y + c z + \sqrt{x^2 + y^2 + z^2}}, \frac{\sqrt{x^2 + y^2 + z^2} \left( b + \frac{y}{\sqrt{x^2 + y^2 + z^2}} \right)}{a x + b y + c z + \sqrt{x^2 + y^2 + z^2}}, \frac{\sqrt{x^2 + y^2 + z^2} \left( c + \frac{z}{\sqrt{x^2 + y^2 + z^2}} \right)}{a x + b y + c z + \sqrt{x^2 + y^2 + z^2}} \right\}$$

In[8]:= **dTilde = d / chi**

Out[8]= 
$$\left\{ \frac{d1 \sqrt{x^2 + y^2 + z^2}}{a x + b y + c z + \sqrt{x^2 + y^2 + z^2}}, \frac{d2 \sqrt{x^2 + y^2 + z^2}}{a x + b y + c z + \sqrt{x^2 + y^2 + z^2}}, \frac{d3 \sqrt{x^2 + y^2 + z^2}}{a x + b y + c z + \sqrt{x^2 + y^2 + z^2}} \right\}$$

In[10]:= **Simplify**[D[Cross[tPrev, dTilde], {{x, y, z}}]]

$$\begin{aligned}
 \text{Out[10]} = & \left\{ \left\{ \frac{(-c d2 + b d3) (b x y + c x z - a (y^2 + z^2))}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2}, \frac{(c d2 - b d3) (-y (a x + c z) + b (x^2 + z^2))}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2}, \right. \right. \\
 & \left. \frac{(c d2 - b d3) (c (x^2 + y^2) - (a x + b y) z)}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2} \right\}, \\
 & \left\{ \frac{(c d1 - a d3) (b x y + c x z - a (y^2 + z^2))}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2}, \frac{(c d1 - a d3) (y (a x + c z) - b (x^2 + z^2))}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2}, \right. \\
 & \left. - \frac{(c d1 - a d3) (c (x^2 + y^2) - (a x + b y) z)}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2} \right\}, \\
 & \left\{ - \frac{(b d1 - a d2) (b x y + c x z - a (y^2 + z^2))}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2}, \right. \\
 & \frac{(b d1 - a d2) (-y (a x + c z) + b (x^2 + z^2))}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2}, \\
 & \left. \frac{(b d1 - a d2) (c (x^2 + y^2) - (a x + b y) z)}{\sqrt{x^2 + y^2 + z^2} \left( a x + b y + c z + \sqrt{x^2 + y^2 + z^2} \right)^2} \right\} \}
 \end{aligned}$$