

In[129]:= $\mathbf{M_S} = \left\{ \{s_x, 0, 0, 0\}, \{0, s_y, 0, 0\}, \{0, 0, s_z, 0\}, \{0, 0, 0, 1\} \right\}$

Out[129]= $\left\{ \{s_x, 0, 0, 0\}, \{0, s_y, 0, 0\}, \{0, 0, s_z, 0\}, \{0, 0, 0, 1\} \right\}$

In[130]:= $\mathbf{M_R} = \left\{ \{\cos\gamma, -\sin\gamma, 0, 0\}, \{\sin\gamma, \cos\gamma, 0, 0\}, \{0, 0, 1, 0\}, \{0, 0, 0, 1\} \right\}$

Out[130]= $\left\{ \{\cos\gamma, -\sin\gamma, 0, 0\}, \{\sin\gamma, \cos\gamma, 0, 0\}, \{0, 0, 1, 0\}, \{0, 0, 0, 1\} \right\}$

In[135]:= $\mathbf{a} = \{\alpha, \beta, \gamma\}$

Out[135]= $\{\alpha, \beta, \gamma\}$

In[132]:= $\mathbf{M_T} = \left\{ \{1, 0, 0, 0\}, \{0, 1, 0, 0\}, \{0, 0, 1, 0\}, \{t_x, t_y, t_z, 1\} \right\}$

Out[132]= $\left\{ \{1, 0, 0, 0\}, \{0, 1, 0, 0\}, \{0, 0, 1, 0\}, \{t_x, t_y, t_z, 1\} \right\}$

In[134]:= $\mathbf{v} = \{x, y, z, 1\}$

Out[134]= $\{x, y, z, 1\}$

In[136]:= $\mathbf{v.M_S.M_R.M_T}$

Out[136]= $\left\{ \cos\gamma x s_x + \sin\gamma y s_y + t_x, -\sin\gamma x s_x + \cos\gamma y s_y + t_y, z s_z + t_z, 1 \right\}$

In[138]:= $\mathbf{M_{MW}} = \mathbf{M_S.M_R.M_T}$

Out[138]= $\left\{ \{\cos\gamma s_x, -\sin\gamma s_x, 0, 0\}, \{\sin\gamma s_y, \cos\gamma s_y, 0, 0\}, \{0, 0, s_z, 0\}, \{t_x, t_y, t_z, 1\} \right\}$

In[139]:= $\mathbf{v.M_{MW}}$

Out[139]= $\left\{ \cos\gamma x s_x + \sin\gamma y s_y + t_x, -\sin\gamma x s_x + \cos\gamma y s_y + t_y, z s_z + t_z, 1 \right\}$

In[140]:= $\mathbf{M_{MW}} // \text{MatrixForm}$

Out[140]//MatrixForm=

$$\begin{pmatrix} \cos\gamma s_x & -\sin\gamma s_x & 0 & 0 \\ \sin\gamma s_y & \cos\gamma s_y & 0 & 0 \\ 0 & 0 & s_z & 0 \\ t_x & t_y & t_z & 1 \end{pmatrix}$$