In[237]:=
```
ClearAll["Global`*"]
```

In[238]:=
```
M_S = {{s_x, 0, 0, 0}, {0, s_y, 0, 0}, {0, 0, s_z, 0}, {0, 0, 0, 1}}
```

Out[238]=
$$\{\{s_x, 0, 0, 0\}, \{0, s_y, 0, 0\}, \{0, 0, s_z, 0\}, \{0, 0, 0, 1\}\}$$

In[239]:=
```
M_R = {{Cos[γ], -Sin[γ], 0, 0}, {Sin[γ], Cos[γ], 0, 0}, {0, 0, 1, 0}, {0, 0, 0, 1}}
```

Out[239]=
$$\{\{\cos\gamma, -\sin\gamma, 0, 0\}, \{\sin\gamma, \cos\gamma, 0, 0\}, \{0, 0, 1, 0\}, \{0, 0, 0, 1\}\}$$

In[240]:=
```
M_T = {{1, 0, 0, 0}, {0, 1, 0, 0}, {0, 0, 1, 0}, {t_x, t_y, t_z, 1}}
```

Out[240]=
$$\{\{1, 0, 0, 0\}, \{0, 1, 0, 0\}, \{0, 0, 1, 0\}, \{t_x, t_y, t_z, 1\}\}$$

In[241]:=
```
v = {x, y, z, 1}
```

Out[241]=
$$\{x, y, z, 1\}$$

In[242]:=
```
v.M_S.M_R.M_T
```

Out[242]=
$$\{\cos\gamma\, x\, s_x + \sin\gamma\, y\, s_y + t_x,\ -\sin\gamma\, x\, s_x + \cos\gamma\, y\, s_y + t_y,\ z\, s_z + t_z,\ 1\}$$

In[243]:=
```
M_MW = M_S.M_R.M_T
```

Out[243]=
$$\{\{\cos\gamma\, s_x, -\sin\gamma\, s_x, 0, 0\}, \{\sin\gamma\, s_y, \cos\gamma\, s_y, 0, 0\}, \{0, 0, s_z, 0\}, \{t_x, t_y, t_z, 1\}\}$$

In[244]:=
```
v.M_MW
```

Out[244]=
$$\{\cos\gamma\, x\, s_x + \sin\gamma\, y\, s_y + t_x,\ -\sin\gamma\, x\, s_x + \cos\gamma\, y\, s_y + t_y,\ z\, s_z + t_z,\ 1\}$$

In[245]:=
```
M_MW // MatrixForm
```

Out[245]//MatrixForm=
$$\begin{pmatrix} \cos\gamma\, s_x & -\sin\gamma\, s_x & 0 & 0 \\ \sin\gamma\, s_y & \cos\gamma\, s_y & 0 & 0 \\ 0 & 0 & s_z & 0 \\ t_x & t_y & t_z & 1 \end{pmatrix}$$

In[246]:=
```
M_i = {{i01, i02, i03, i04}, {i05, i06, i07, i08},
  {i09, i10, i11, i12}, {i13, i14, i15, i16}}
```

Out[246]=
$$\{\{i01, i02, i03, i04\}, \{i05, i06, i07, i08\}, \{i09, i10, i11, i12\}, \{i13, i14, i15, i16\}\}$$

In[247]:=
```
M_j = {{j01, j02, j03, j04}, {j05, j06, j07, j08},
  {j09, j10, j11, j12}, {j13, j14, j15, j16}}
```

Out[247]=
$$\{\{j01, j02, j03, j04\}, \{j05, j06, j07, j08\}, \{j09, j10, j11, j12\}, \{j13, j14, j15, j16\}\}$$

In[248]:=
```
M_i.M_j // MatrixForm
```

Out[248]//MatrixForm=
$$\begin{pmatrix} i01\, j01 + i02\, j05 + i03\, j09 + i04\, j13 & i01\, j02 + i02\, j06 + i03\, j10 + i04\, j14 & i01\, j03 + i02\, j07 + i \\ i05\, j01 + i06\, j05 + i07\, j09 + i08\, j13 & i05\, j02 + i06\, j06 + i07\, j10 + i08\, j14 & i05\, j03 + i06\, j07 + i \\ i09\, j01 + i10\, j05 + i11\, j09 + i12\, j13 & i09\, j02 + i10\, j06 + i11\, j10 + i12\, j14 & i09\, j03 + i10\, j07 + i \\ i13\, j01 + i14\, j05 + i15\, j09 + i16\, j13 & i13\, j02 + i14\, j06 + i15\, j10 + i16\, j14 & i13\, j03 + i14\, j07 + i \end{pmatrix}$$

In[249]:=
```
M_i = {{i01, i02, i03, 0}, {i05, i06, i07, 0}, {i09, i10, i11, 0}, {i13, i14, i15, 1}}
```

Out[249]=
$$\{\{i01, i02, i03, 0\}, \{i05, i06, i07, 0\}, \{i09, i10, i11, 0\}, \{i13, i14, i15, 1\}\}$$

In[250]:=
```
Mj = {{j01, j02, j03, 0}, {j05, j06, j07, 0}, {j09, j10, j11, 0}, {j13, j14, j15, 1}}
```

Out[250]=
```
{{j01, j02, j03, 0}, {j05, j06, j07, 0}, {j09, j10, j11, 0}, {j13, j14, j15, 1}}
```

In[251]:=
```
Mi.Mj // MatrixForm
```

Out[251]//MatrixForm=

$$\begin{pmatrix} i01\,j01 + i02\,j05 + i03\,j09 & i01\,j02 + i02\,j06 + i03\,j10 & i01\,j03 + i02\,j07 + i03\,j1 \\ i05\,j01 + i06\,j05 + i07\,j09 & i05\,j02 + i06\,j06 + i07\,j10 & i05\,j03 + i06\,j07 + i07\,j1 \\ i09\,j01 + i10\,j05 + i11\,j09 & i09\,j02 + i10\,j06 + i11\,j10 & i09\,j03 + i10\,j07 + i11\,j1 \\ i13\,j01 + i14\,j05 + i15\,j09 + j13 & i13\,j02 + i14\,j06 + i15\,j10 + j14 & i13\,j03 + i14\,j07 + i15\,j11 + \end{pmatrix}$$