

```
Clear["Global`*"]
```

```
fmu = {{0, -ex, -ey, -ez}, {ex, 0, -bz, by}, {ey, bz, 0, -bx}, {ez, -by, bx, 0}};
```

```
fmu // MatrixForm
```

$$\begin{pmatrix} 0 & -ex & -ey & -ez \\ ex & 0 & -bz & by \\ ey & bz & 0 & -bx \\ ez & -by & bx & 0 \end{pmatrix}$$

```
boost = {{γ, 0, 0, γβ}, {0, 1, 0, 0}, {0, 0, 1, 0}, {γβ, 0, 0, γ}};
```

```
boost // MatrixForm
```

$$\begin{pmatrix} \gamma & 0 & 0 & \beta \gamma \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ \beta \gamma & 0 & 0 & \gamma \end{pmatrix}$$

```
fmu2 = boost.fmu.boost
```

```
{{0, -ex γ - by β γ, -ey γ + bx β γ, -ez γ2 + ez β2 γ2}, {ex γ + by β γ, 0, -bz, by γ + ex β γ},  
{ey γ - bx β γ, bz, 0, -bx γ + ey β γ}, {ez γ2 - ez β2 γ2, -by γ - ex β γ, bx γ - ey β γ, 0}}
```

```
(fmu2 // Simplify) /. {γ2 →  $\frac{1}{1-\beta^2}$ } // Simplify // MatrixForm
```

$$\begin{pmatrix} 0 & -(ex + by \beta) \gamma & -ey \gamma + bx \beta \gamma & -ez \\ (ex + by \beta) \gamma & 0 & -bz & (by + ex \beta) \gamma \\ (ey - bx \beta) \gamma & bz & 0 & -bx \gamma + ey \beta \gamma \\ ez & -(by + ex \beta) \gamma & (bx - ey \beta) \gamma & 0 \end{pmatrix}$$

```
boost.(boost /. β → -β) /. {γ2 →  $\frac{1}{1-\beta^2}$ } // Simplify // MatrixForm
```

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$