```
d = {{0, 1, 0, 0}, {0, 0, -N, 0}, {0, 0, 0, 1}, {-N, 0, 0, 0}}; MatrixForm[d]
```

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

```
unit = {{1, 0, 0, 0}, {0, 1, 0, 0}, {0, 0, 1, 0}, {0, 0, 0, 1}}; MatrixForm[unit]
```

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

```
MatrixForm[d.d]
```

$$\begin{pmatrix} 0 & 0 & -N & 0 \\ 0 & 0 & 0 & -N \\ -N & 0 & 0 & 0 \\ 0 & -N & 0 & 0 \end{pmatrix}$$

```
m1 = Sign[N] * d.d / N + unit; MatrixForm[m1]
```

$$\begin{pmatrix} 1 & 0 & -\text{Sign}[N] & 0 \\ 0 & 1 & 0 & -\text{Sign}[N] \\ -\text{Sign}[N] & 0 & 1 & 0 \\ 0 & -\text{Sign}[N] & 0 & 1 \end{pmatrix}$$

```
m2 = Sign[N] * d.d / N - unit; MatrixForm[m2]
```

$$\begin{pmatrix} -1 & 0 & -\text{Sign}[N] & 0 \\ 0 & -1 & 0 & -\text{Sign}[N] \\ -\text{Sign}[N] & 0 & -1 & 0 \\ 0 & -\text{Sign}[N] & 0 & -1 \end{pmatrix}$$

```
mf = Cos[φ] * unit + Sin[φ] * d / Sqrt[Abs[N]] ; MatrixForm[mf]
md = Cosh[φ] * unit + Sinh[φ] * d / Sqrt[Abs[N]] ; MatrixForm[md]
```

$$\begin{pmatrix} \text{Cos}[\varphi] & \frac{\text{Sin}[\varphi]}{\sqrt{\text{Abs}[N]}} & 0 & 0 \\ 0 & \text{Cos}[\varphi] & -\frac{N\,\text{Sin}[\varphi]}{\sqrt{\text{Abs}[N]}} & 0 \\ 0 & 0 & \text{Cos}[\varphi] & \frac{\text{Sin}[\varphi]}{\sqrt{\text{Abs}[N]}} \\ -\frac{N\,\text{Sin}[\varphi]}{\sqrt{\text{Abs}[N]}} & 0 & 0 & \text{Cos}[\varphi] \end{pmatrix}$$

$$\begin{pmatrix} \text{Cosh}[\varphi] & \frac{\text{Sinh}[\varphi]}{\sqrt{\text{Abs}[N]}} & 0 & 0 \\ 0 & \text{Cosh}[\varphi] & -\frac{N\,\text{Sinh}[\varphi]}{\sqrt{\text{Abs}[N]}} & 0 \\ 0 & 0 & \text{Cosh}[\varphi] & \frac{\text{Sinh}[\varphi]}{\sqrt{\text{Abs}[N]}} \\ -\frac{N\,\text{Sinh}[\varphi]}{\sqrt{\text{Abs}[N]}} & 0 & 0 & \text{Cosh}[\varphi] \end{pmatrix}$$

```
sq = (mf.m1 - md.m2) / 2; MatrixForm[Simplify[sq]]
```

$$\begin{pmatrix} \frac{1}{2}\left(\text{Cos}[\varphi]+\text{Cosh}[\varphi]\right) & \frac{\text{Sin}[\varphi]+\text{Sinh}[\varphi]}{2\sqrt{\text{Abs}[N]}} & -\frac{1}{2}\left(\text{Cos}[\varphi]-\text{Cosh}[\varphi]\right)\text{Sign}[\\ \frac{N\,\text{Sign}[N]\,(\text{Sin}[\varphi]-\text{Sinh}[\varphi])}{2\sqrt{\text{Abs}[N]}} & \frac{1}{2}\left(\text{Cos}[\varphi]+\text{Cosh}[\varphi]\right) & -\frac{N\,(\text{Sin}[\varphi]+\text{Sinh}[\varphi])}{2\sqrt{\text{Abs}[N]}} \\ -\frac{1}{2}\left(\text{Cos}[\varphi]-\text{Cosh}[\varphi]\right)\text{Sign}[N] & \frac{\text{Sign}[N]\,(-\text{Sin}[\varphi]+\text{Sinh}[\varphi])}{2\sqrt{\text{Abs}[N]}} & \frac{1}{2}\left(\text{Cos}[\varphi]+\text{Cosh}[\varphi]\right) \\ -\frac{N\,(\text{Sin}[\varphi]+\text{Sinh}[\varphi])}{2\sqrt{\text{Abs}[N]}} & -\frac{1}{2}\left(\text{Cos}[\varphi]-\text{Cosh}[\varphi]\right)\text{Sign}[N] & \frac{N\,\text{Sign}[N]\,(\text{Sin}[\varphi]-\text{Sinh}[\varphi])}{2\sqrt{\text{Abs}[N]}} \end{pmatrix}$$