```
M = {{c, A}, {B, d}}; M // MatrixForm
```

$$\begin{pmatrix} c & A \\ B & d \end{pmatrix}$$

```
Produkt[f_, J_] :=
 {{{#[[1]], #[[3]]}, {#[[2]], #[[4]]}}, {{#[[5]], #[[7]]}, {#[[6]], #[[8]]}}} &[
  Flatten[Dot[f, Transpose[#]] & /@ J]]
```

```
Produkt[{{c, A}, {B, d}}, J] // MatrixForm
```

$$\begin{pmatrix} \begin{pmatrix} -0.0607251\,A - 0.0695046\,c \\ -0.0695046\,B - 0.0607251\,d \end{pmatrix} & \begin{pmatrix} -0.0695046\,A + 0.0607251\,c \\ 0.0607251\,B - 0.0695046\,d \end{pmatrix} \\ \begin{pmatrix} -0.00626055\,A - 0.0254079\,c \\ -0.0254079\,B - 0.00626055\,d \end{pmatrix} & \begin{pmatrix} -0.0254079\,A + 0.00626055\,c \\ 0.00626055\,B - 0.0254079\,d \end{pmatrix} \end{pmatrix}$$

```
Pos[i_, J_] := Transpose[#][[i]] & /@ J
```

```
Pos[1, J]
```

```
{{-0.0695046, 0.0607251}, {-0.0254079, 0.00626055}}
```

```
Produkt[{{c, A}, {B, d}}, J] // MatrixForm
```

$$\begin{pmatrix} -0.0607251\,A - 0.0695046\,c \\ -0.0695046\,A + 0.0607251\,c \\ -0.0695046\,B - 0.0607251\,d \\ 0.0607251\,B - 0.0695046\,d \\ -0.00626055\,A - 0.0254079\,c \\ -0.0254079\,A + 0.00626055\,c \\ -0.0254079\,B - 0.00626055\,d \\ 0.00626055\,B - 0.0254079\,d \end{pmatrix}$$

```
J // MatrixForm
```

$$\begin{pmatrix} \begin{pmatrix} -0.0695046 \\ -0.0607251 \end{pmatrix} & \begin{pmatrix} 0.0607251 \\ -0.0695046 \end{pmatrix} \\ \begin{pmatrix} -0.0254079 \\ -0.00626055 \end{pmatrix} & \begin{pmatrix} 0.00626055 \\ -0.0254079 \end{pmatrix} \end{pmatrix}$$

```
J[[1]] // MatrixForm
```

$$\begin{pmatrix} -0.0695046 & -0.0607251 \\ 0.0607251 & -0.0695046 \end{pmatrix}$$

```
Outer[Times, M, {K1, K2}] // MatrixForm
```

$$\begin{pmatrix} \begin{pmatrix} c\,K1 \\ c\,K2 \end{pmatrix} & \begin{pmatrix} A\,K1 \\ A\,K2 \end{pmatrix} \\ \begin{pmatrix} B\,K1 \\ B\,K2 \end{pmatrix} & \begin{pmatrix} d\,K1 \\ d\,K2 \end{pmatrix} \end{pmatrix}$$

```
J = {{Re[#], -Im[#]}, {Im[#], Re[#]}} & /@ UnD[En, m, NN[[2]], 0.1];
```

```
M = {{A, B}, {-B, A}}; M // MatrixForm
```

$$\begin{pmatrix} A & B \\ -B & A \end{pmatrix}$$

```
aM = {{X, Y}, {-Y, X}}; aM // MatrixForm
```

$$\begin{pmatrix} X & Y \\ -Y & X \end{pmatrix}$$

```
M . aM
```

$$\{\{A\ X - B\ Y,\ B\ X + A\ Y\},\ \{-B\ X - A\ Y,\ A\ X - B\ Y\}\}$$

```
Expand[(A + I B) * (X - I Y)] / Expand[((X + I Y) * (X - I Y))]
```

$$\frac{A\ X + i\ B\ X - i\ A\ Y + B\ Y}{X^2 + Y^2}$$