In[61]:=
```
ClearAll["Global`*"]
N6i = {{1 - 3 ϵ - 3 η + 2 ϵ^2 + 2 η^2 + 4 ϵ * η}, {2 ϵ^2 - ϵ},
   {2 η^2 - η}, {4 ϵ - 4 ϵ^2 - 4 ϵ * η}, {4 ϵ * η}, {4 η - 4 η^2 - 4 ϵ * η}};
MatrixForm[N6i]
N6j = Transpose[N6i];
N3i = {{1 - ϵ - η}, {ϵ}, {η}};
MatrixForm[N3i]
N3j = Transpose[N3i];

xj = {{x1, x2, x3, x4, x5, x6}};
yj = {{y1, y2, y3, y4, y5, y6}};
xi = Transpose[xj];
yi = Transpose[yj];

xa = N6j.xi;
ya = N6j.yi;

dxade = D[xa, ϵ];
dyade = D[ya, ϵ];
dxadn = D[xa, η];
dyadn = D[ya, η];

J = {{dxade, dyade}, {dxadn, dyadn}};
mJ = (dxade * dyadn) - (dyade * dxadn);
mJ = mJ[[1, 1]];
B = {{dyadn, -dyade}, {-dxadn, dxade}} / mJ;
MatrixForm[Collect[J, {ϵ, η}]]
MatrixForm[Collect[B, {ϵ, η}]]

dxade = j11 + j12 * ϵ + j13 * η;
dyade = j21 + j22 * ϵ + j23 * η;
dxadn = j31 + j32 * ϵ + j33 * η;
dyadn = j41 + j42 * ϵ + j43 * η;
mJ = (dxade * dyadn) - (dyade * dxadn);
B = {{dyadn, -dyade}, {-dxadn, dxade}} / mJ;
MatrixForm[B]
```

Out[63]//MatrixForm=

$$\begin{pmatrix} 1 - 3\,\epsilon + 2\,\epsilon^2 - 3\,\eta + 4\,\epsilon\,\eta + 2\,\eta^2 \\ -\epsilon + 2\,\epsilon^2 \\ -\eta + 2\,\eta^2 \\ 4\,\epsilon - 4\,\epsilon^2 - 4\,\epsilon\,\eta \\ 4\,\epsilon\,\eta \\ 4\,\eta - 4\,\epsilon\,\eta - 4\,\eta^2 \end{pmatrix}$$

Out[66]//MatrixForm=

$$\begin{pmatrix} 1-\epsilon-\eta \\ \epsilon \\ \eta \end{pmatrix}$$

Out[82]//MatrixForm=

$$\begin{pmatrix} \left(-3\,x1-x2+4\,x4+\left(4\,x1+4\,x2-8\,x4\right)\epsilon+\left(4\,x1-4\,x4+4\,x5-4\,x6\right)\eta\right) & \left(-3\,y1-y2+4\,y4+\left(4\,y1\right.\right. \\ \left(-3\,x1-x3+4\,x6+\left(4\,x1-4\,x4+4\,x5-4\,x6\right)\epsilon+\left(4\,x1+4\,x3-8\,x6\right)\eta\right) & \left(-3\,y1-y3+4\,y6+\left(4\,y1\right.\right. \end{pmatrix}$$

Out[83]//MatrixForm=

$$\begin{pmatrix} \dfrac{-4\,y4\,\epsilon+4\,y5\,\epsilon+y6\,(4-4\,\epsilon-8\,\eta)+y3\,(-1+\epsilon}{-(-4\,x4\,\epsilon+4\,x5\,\epsilon+x6\,(4-4\,\epsilon-8\,\eta)+x3\,(-1+4\,\eta)+x1\,(-3+4\,\epsilon+4\,\eta))\,(y2\,(-1+4\,\epsilon)+y4\,(4-8\,\epsilon-4\,\eta)+4\,y5\,\eta-4\,y6\,\eta+y1\,(-3+4\,\epsilon+4\,\eta))+(x2\,(-1} \\ \dfrac{4\,x4\,\epsilon-4\,x5\,\epsilon-x6\,(4-4\,\epsilon-8\,\eta)-x3\,(-1+4}{-(-4\,x4\,\epsilon+4\,x5\,\epsilon+x6\,(4-4\,\epsilon-8\,\eta)+x3\,(-1+4\,\eta)+x1\,(-3+4\,\epsilon+4\,\eta))\,(y2\,(-1+4\,\epsilon)+y4\,(4-8\,\epsilon-4\,\eta)+4\,y5\,\eta-4\,y6\,\eta+y1\,(-3+4\,\epsilon+4\,\eta))+(x2\,(-1} \end{pmatrix}$$

Out[90]//MatrixForm=

$$\begin{pmatrix} \dfrac{j41+j42\,\epsilon+j43\,\eta}{-(j21+j22\,\epsilon+j23\,\eta)\,(j31+j32\,\epsilon+j33\,\eta)+(j11+j12\,\epsilon+j13\,\eta)\,(j41+j42\,\epsilon+j43\,\eta)} & \dfrac{-j21-j22\,\epsilon-j23\,\eta}{-(j21+j22\,\epsilon+j23\,\eta)\,(j31+j32\,\epsilon+j33\,\eta)+(j11+j12\,\epsilon+j} \\ \dfrac{-j31-j32\,\epsilon-j33\,\eta}{-(j21+j22\,\epsilon+j23\,\eta)\,(j31+j32\,\epsilon+j33\,\eta)+(j11+j12\,\epsilon+j13\,\eta)\,(j41+j42\,\epsilon+j43\,\eta)} & \dfrac{j11+j12\,\epsilon+j13\,\eta}{-(j21+j22\,\epsilon+j23\,\eta)\,(j31+j32\,\epsilon+j33\,\eta)+(j11+j12\,\epsilon+j} \end{pmatrix}$$