- **Verify Proposition B.2 in the special case of 1+5, 2+4,3+3 blocks in a 6x6 matrix.**
- **Block 1+5**

In[9]:=
```
Q = {{0,0,0,0,0,1},{1,0,0,0,0,0},{0,1,0,0,0,0},{0,0,1,0,0,0},{0,0,0,1,0,0},{0,0,0,0,1,0}};
```

$$Q = \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \end{pmatrix};$$

In[10]:=

$$P = \begin{pmatrix} a1 & 0 & 0 & 0 & 0 & 0 \\ 0 & b11 & b12 & b13 & b14 & b15 \\ 0 & b21 & b22 & b23 & b24 & b25 \\ 0 & b31 & b32 & b33 & b34 & b35 \\ 0 & b41 & b42 & b43 & b44 & b45 \\ 0 & b51 & b52 & b53 & b54 & b55 \end{pmatrix};$$

In[11]:=
```
Inverse[Q].P.Q // MatrixForm
```

Out[11]//MatrixForm=

$$\begin{pmatrix} b11 & b12 & b13 & b14 & b15 & 0 \\ b21 & b22 & b23 & b24 & b25 & 0 \\ b31 & b32 & b33 & b34 & b35 & 0 \\ b41 & b42 & b43 & b44 & b45 & 0 \\ b51 & b52 & b53 & b54 & b55 & 0 \\ 0 & 0 & 0 & 0 & 0 & a1 \end{pmatrix}$$

In[12]:=
```
Union[Flatten[Transpose[Q] - Inverse[Q]]] // MatrixForm
```

Out[12]//MatrixForm=

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

- **Block 2+4**

In[13]:=

$$Q = \begin{pmatrix} 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \end{pmatrix};$$

In[15]:=

$$P = \begin{pmatrix} a1 & a2 & 0 & 0 & 0 & 0 \\ a3 & a4 & 0 & 0 & 0 & 0 \\ 0 & 0 & b1 & b2 & b3 & b4 \\ 0 & 0 & b5 & b6 & b7 & b8 \\ 0 & 0 & b9 & b10 & b11 & b12 \\ 0 & 0 & b13 & b14 & b15 & b16 \end{pmatrix};$$

In[16]:=
```
Inverse[Q].P.Q // MatrixForm
```

Out[16]//MatrixForm=

$$\begin{pmatrix} b1 & b2 & b3 & b4 & 0 & 0 \\ b5 & b6 & b7 & b8 & 0 & 0 \\ b9 & b10 & b11 & b12 & 0 & 0 \\ b13 & b14 & b15 & b16 & 0 & 0 \\ 0 & 0 & 0 & 0 & a1 & a2 \\ 0 & 0 & 0 & 0 & a3 & a4 \end{pmatrix}$$

In[17]:=
```
Union[Flatten[Transpose[Q] - Inverse[Q]]] // MatrixForm
```
Out[17]//MatrixForm=

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

■ Block 3+3

In[18]:=
$$Q = \begin{pmatrix} 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \end{pmatrix};$$

In[19]:=
$$P = \begin{pmatrix} a1 & a2 & a3 & 0 & 0 & 0 \\ a4 & a5 & a6 & 0 & 0 & 0 \\ a7 & a8 & a9 & 0 & 0 & 0 \\ 0 & 0 & 0 & b1 & b2 & b3 \\ 0 & 0 & 0 & b4 & b5 & b6 \\ 0 & 0 & 0 & b7 & b8 & b9 \end{pmatrix};$$

In[20]:=
```
Inverse[Q].P.Q // MatrixForm
```
Out[20]//MatrixForm=

$$\begin{pmatrix} b1 & b2 & b3 & 0 & 0 & 0 \\ b4 & b5 & b6 & 0 & 0 & 0 \\ b7 & b8 & b9 & 0 & 0 & 0 \\ 0 & 0 & 0 & a1 & a2 & a3 \\ 0 & 0 & 0 & a4 & a5 & a6 \\ 0 & 0 & 0 & a7 & a8 & a9 \end{pmatrix}$$

In[21]:=
```
Union[Flatten[Transpose[Q] - Inverse[Q]]] // MatrixForm
```
Out[21]//MatrixForm=

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