In[1]:=
```
SetDirectory["/www/user/fdahl/papers/Conjugation/"];
<< kappaLib.m
<< Petrov.m
```

```
KappaLib v1.1

Petrov routine loaded
```

- **Class XIII: (2 2 2)**

In[4]:=
$$B = \begin{pmatrix} 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \end{pmatrix};$$

In[5]:=
$$V = \begin{pmatrix} lam1 & 1 & 0 & 0 & 0 & 0 \\ 0 & lam1 & 0 & 0 & 0 & 0 \\ 0 & 0 & lam2 & 1 & 0 & 0 \\ 0 & 0 & 0 & lam2 & 0 & 0 \\ 0 & 0 & 0 & 0 & lam3 & 1 \\ 0 & 0 & 0 & 0 & 0 & lam3 \end{pmatrix};$$

In[6]:=
```
Eigenvalues[V]
```

Out[6]=
```
{lam1, lam1, lam2, lam2, lam3, lam3}
```

In[7]:=
$$W = \begin{pmatrix} 0 & eps1 & 0 & 0 & 0 & 0 \\ eps1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & eps2 & 0 & 0 \\ 0 & 0 & eps2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & eps3 \\ 0 & 0 & 0 & 0 & eps3 & 0 \end{pmatrix};$$

- **eps1,2,3 have the same block size, so we may assume that e1 <= eps2 <= eps3: Otherwise all configurations are possible:**

In[8]:=
```
Sort[Eigenvalues[W] /. {eps1 → -1, eps2 → -1, eps3 → -1}]
Sort[Eigenvalues[W] /. {eps1 → -1, eps2 → -1, eps3 → 1}]
Sort[Eigenvalues[W] /. {eps1 → -1, eps2 → 1, eps3 → 1}]
Sort[Eigenvalues[W] /. {eps1 → 1, eps2 → 1, eps3 → 1}]
```

Out[8]=
```
{-1, -1, -1, 1, 1, 1}
```

Out[9]=
```
{-1, -1, -1, 1, 1, 1}
```

Out[10]=
```
{-1, -1, -1, 1, 1, 1}
```

Out[11]=
```
{-1, -1, -1, 1, 1, 1}
```

In[12]:=
```
(* See ClassXIII_Solve.nb *)
```

$$S = \begin{pmatrix} 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & eps2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ eps1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & eps3 & 0 \end{pmatrix};$$

Check that S is in set mathcal(S)

In[13]:=
```
Transpose[S].B.S == W
```

Out[13]=
```
True
```

■ Compute result

In[14]:=
```
res = S.V.Inverse[S];
res // MatrixForm
```

Out[15]//MatrixForm=

$$\begin{pmatrix} lam1 & 0 & 0 & 0 & 0 & 0 \\ 0 & lam2 & 0 & 0 & eps2 & 0 \\ 0 & 0 & lam3 & 0 & 0 & 0 \\ eps1 & 0 & 0 & lam1 & 0 & 0 \\ 0 & 0 & 0 & 0 & lam2 & 0 \\ 0 & 0 & eps3 & 0 & 0 & lam3 \end{pmatrix}$$

In[16]:=
```
Petrov[res]
```

Out[16]//MatrixForm=

$$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & lam1 \\ 0 & eps2 & 0 & 0 & lam2 & 0 \\ 0 & 0 & 0 & lam3 & 0 & 0 \\ 0 & 0 & lam3 & eps3 & 0 & 0 \\ 0 & lam2 & 0 & 0 & 0 & 0 \\ lam1 & 0 & 0 & 0 & 0 & eps1 \end{pmatrix}$$

■ Export notebook as .pdf

In[17]:=
```
NotebookPrint[SelectedNotebook[],
 "/www/user/fdahl/papers/Conjugation/notebooks/ClassXIII.pdf"]
```