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

```
KappaLib v1.1

Petrov routine loaded
```

- **Class XVII: (211 1bar(1))**

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]:=
$$V = \begin{pmatrix} lam1 & 1 & 0 & 0 & 0 & 0 \\ 0 & lam1 & 0 & 0 & 0 & 0 \\ 0 & 0 & lam2 & 0 & 0 & 0 \\ 0 & 0 & 0 & lam3 & 0 & 0 \\ 0 & 0 & 0 & 0 & sigma1 & tau1 \\ 0 & 0 & 0 & 0 & -tau1 & sigma1 \end{pmatrix};$$

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

Out[6]=
```
{lam1, lam1, lam2, lam3, sigma1 - i tau1, sigma1 + i tau1}
```

In[7]:=
$$W = \begin{pmatrix} 0 & eps1 & 0 & 0 & 0 & 0 \\ eps1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & eps2 & 0 & 0 & 0 \\ 0 & 0 & 0 & eps3 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 \end{pmatrix};$$

In[8]:=
```
Eigenvalues[W]
```

Out[8]=
```
{-1, 1, -eps1, eps1, eps2, eps3}
```

- **eps2 and eps3 have the same block size so we may assume that eps2 <= esp3. From Eigenvalues[W] we see that eps2 and eps3 can not be of the same sign.**

In[9]:=
```
W = W /. {eps2 → -1, eps3 → 1};
Eigenvalues[W]
```

Out[10]=
```
{-1, -1, 1, 1, -eps1, eps1}
```

- **eps1 is arbitrary**

In[11]:=
```
Sort[Eigenvalues[W] /. {eps1 → -1}]
Sort[Eigenvalues[W] /. {eps1 → 1}]
```

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

Out[12]=
```
{-1, -1, -1, 1, 1, 1}
```

In[13]:=
$$S = \begin{pmatrix} 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 & 0 \\ \text{eps1} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 & 0 \end{pmatrix};$$

■ Check that S is in the set mathcal(S)

In[14]:=
```
Transpose[S].B.S == W
```

Out[14]=
```
True
```

■ Compute result

In[15]:=
```
res = S.V.Inverse[S];
res // MatrixForm
```

Out[16]//MatrixForm=
$$\begin{pmatrix} \text{lam1} & 0 & 0 & 0 & 0 & 0 \\ 0 & \text{sigma1} & 0 & 0 & -\text{tau1} & 0 \\ 0 & 0 & \frac{\text{lam2}}{2}+\frac{\text{lam3}}{2} & 0 & 0 & -\frac{\text{lam2}}{2}+\frac{\text{lam3}}{2} \\ \text{eps1} & 0 & 0 & \text{lam1} & 0 & 0 \\ 0 & \text{tau1} & 0 & 0 & \text{sigma1} & 0 \\ 0 & 0 & -\frac{\text{lam2}}{2}+\frac{\text{lam3}}{2} & 0 & 0 & \frac{\text{lam2}}{2}+\frac{\text{lam3}}{2} \end{pmatrix}$$

In[17]:=
```
Petrov[res]
```

Out[17]//MatrixForm=
$$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \text{lam1} \\ 0 & -\text{tau1} & 0 & 0 & \text{sigma1} & 0 \\ 0 & 0 & \frac{1}{2}(-\text{lam2}+\text{lam3}) & \frac{\text{lam2}+\text{lam3}}{2} & 0 & 0 \\ 0 & 0 & \frac{\text{lam2}+\text{lam3}}{2} & \frac{1}{2}(-\text{lam2}+\text{lam3}) & 0 & 0 \\ 0 & \text{sigma1} & 0 & 0 & \text{tau1} & 0 \\ \text{lam1} & 0 & 0 & 0 & 0 & \text{eps1} \end{pmatrix}$$

■ Export notebook as .pdf

In[18]:=
```
NotebookPrint[SelectedNotebook[],
 "/www/user/fdahl/papers/Conjugation/notebooks/ClassXVII.pdf"]
```