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

```
KappaLib v1.1

Petrov routine loaded
```

■ Class V: (11 2 bar(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]:=
$$V = \begin{pmatrix} \text{lambda1} & 0 & 0 & 0 & 0 & 0 \\ 0 & \text{lambda2} & 0 & 0 & 0 & 0 \\ 0 & 0 & \text{sigma1} & \text{tau1} & 1 & 0 \\ 0 & 0 & -\text{tau1} & \text{sigma1} & 0 & 1 \\ 0 & 0 & 0 & 0 & \text{sigma1} & \text{tau1} \\ 0 & 0 & 0 & 0 & -\text{tau1} & \text{sigma1} \end{pmatrix};$$

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

Out[6]=
```
{lambda1, lambda2, sigma1 - i tau1, sigma1 - i tau1, sigma1 + i tau1, sigma1 + i tau1}
```

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

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

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

In[9]:=
```
(* We know that NN should have signature (3,3) and eps1 ≤ eps2. *)
```

In[10]:=
```
W = W /. {eps1 → -1, eps2 → 1};
W // MatrixForm
Eigenvalues[W]
```

Out[11]//MatrixForm=
$$\begin{pmatrix} -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \end{pmatrix}$$

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

In[13]:=
```
(* Permutation 6,6 with leading B *)
S = {{0, 0, 0, 0, 0, 1}, {0, 0, 0, 0, 1, 0}, {1/Sqrt[2], 1/Sqrt[2], 0, 0, 0, 0}, {0, 0, 1, 0, 0, 0}, {0, 0, 0, 1, 0, 0}, {-1/Sqrt[2], 1/Sqrt[2], 0, 0, 0, 0}};
```

■ Check that S is in 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=

$$\begin{pmatrix} \text{sigma1} & -\text{tau1} & 0 & 0 & 0 & 0 \\ \text{tau1} & \text{sigma1} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\text{lambda1}}{2}+\frac{\text{lambda2}}{2} & 0 & 0 & -\frac{\text{lambda1}}{2}+\frac{\text{lambda2}}{2} \\ 0 & 1 & 0 & \text{sigma1} & \text{tau1} & 0 \\ 1 & 0 & 0 & -\text{tau1} & \text{sigma1} & 0 \\ 0 & 0 & -\frac{\text{lambda1}}{2}+\frac{\text{lambda2}}{2} & 0 & 0 & \frac{\text{lambda1}}{2}+\frac{\text{lambda2}}{2} \end{pmatrix}$$

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

Out[17]//MatrixForm=

$$\begin{pmatrix} 0 & 0 & 0 & 0 & -\text{tau1} & \text{sigma1} \\ 0 & 0 & 0 & 0 & \text{sigma1} & \text{tau1} \\ 0 & 0 & \frac{1}{2}(-\text{lambda1}+\text{lambda2}) & \frac{\text{lambda1}+\text{lambda2}}{2} & 0 & 0 \\ 0 & 0 & \frac{\text{lambda1}+\text{lambda2}}{2} & \frac{1}{2}(-\text{lambda1}+\text{lambda2}) & 0 & 0 \\ -\text{tau1} & \text{sigma1} & 0 & 0 & 0 & 1 \\ \text{sigma1} & \text{tau1} & 0 & 0 & 1 & 0 \end{pmatrix}$$

■ Export notebook as .pdf

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