

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

KappaLib v1.1

Petrov routine loaded

## ■ Class IX: (42)

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

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

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

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

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

## ■ All sign configurations are possible

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

$$\text{In[12]:= } \mathbf{S} = \begin{pmatrix} 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ \text{eps1} & 0 & 0 & 0 & 0 & 0 \\ 0 & \text{eps1} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \text{eps2} & 0 \end{pmatrix};$$

**Check that  $S$  is in set  $\text{mathcal{S}}$** 

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

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

**■ Compute result**

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

```
Out[15]//MatrixForm=
```

$$\begin{pmatrix} \text{lam1} & 0 & 0 & 0 & 0 & 0 \\ 1 & \text{lam1} & 0 & 0 & 0 & 0 \\ 0 & 0 & \text{lam2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \text{lam1} & 1 & 0 \\ 0 & \text{eps1} & 0 & 0 & \text{lam1} & 0 \\ 0 & 0 & \text{eps2} & 0 & 0 & \text{lam2} \end{pmatrix}$$

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

```
Out[16]//MatrixForm=
```

$$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \text{lam1} \\ 0 & 0 & 0 & 0 & \text{lam1} & 1 \\ 0 & 0 & 0 & \text{lam2} & 0 & 0 \\ 0 & 0 & \text{lam2} & \text{eps2} & 0 & 0 \\ 0 & \text{lam1} & 0 & 0 & \text{eps1} & 0 \\ \text{lam1} & 1 & 0 & 0 & 0 & 0 \end{pmatrix}$$

**■ Export notebook as .pdf**

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