4c. Explicit expressions for the basis functions

See (2.24)

```
In[ ]:= Clear[al, bt, zt]
        k = km[zt, al, bt] // MatrixForm
```

Out[ ]//MatrixForm=

$$\begin{pmatrix} \text{al zt} & \text{bt zt} & 0 \\ -\text{zt Conjugate[bt]} & \text{zt Conjugate[al]} & 0 \\ 0 & 0 & \frac{1}{\text{zt}^2} \end{pmatrix}$$

```
In[ ]:= Clear[Phi, Xpol, genf]
        genf[p_, q_, {zt_, al_, bt_}] =
          (al Xpol - Conjugate[bt])^((p - q)/2) (bt Xpol + Conjugate[al])^((p + q)/2);
        Phi[h_, p_, r_, q_, {zt_, al_, bt_}] := zt^(-h) If[p == r, genf[p, q, {zt, al, bt}] /. Xpol → 0,
           Coefficient[genf[p, q, {zt, al, bt}], Xpol^((p - r)/2)]]
```

```
In[ ]:= Phi[h, 0, 0, 0, {zt, al, bt}]
```

Out[ ]= zt^{-h}

```
In[ ]:= Phi[h, 1, 1, 1, {zt, al, bt}]
        Phi[h, 1, 1, -1, {zt, al, bt}]
        Phi[h, 1, -1, 1, {zt, al, bt}]
        Phi[h, 1, -1, -1, {zt, al, bt}]
```

Out[ ]= $\text{zt}^{-h}\,\text{Conjugate[al]}$

Out[ ]= $-\text{zt}^{-h}\,\text{Conjugate[bt]}$

Out[ ]= bt zt^{-h}

Out[ ]= al zt^{-h}

```
In[ ]:= km[zt, al, bt] // MatrixForm
```

Out[ ]//MatrixForm=

$$\begin{pmatrix} \text{al zt} & \text{bt zt} & 0 \\ -\text{zt Conjugate[bt]} & \text{zt Conjugate[al]} & 0 \\ 0 & 0 & \frac{1}{\text{zt}^2} \end{pmatrix}$$