12a. N-trivial eigenfunction modules

See §3.4.2.1

Use of routine for eigenfunction equations

```
In[ ]:= Clear[f, nu, j]
        {deq, rel} = efeqt[h, 0, 0, f]
```

$$\text{Out[ ]=}\ \left\{\frac{1}{12}\left(h^2-4\times\left(-12+j^2+3\,nu^2\right)\right)f[0,t]+t\left(-3\,f^{(0,1)}[0,t]+t\,f^{(0,2)}[0,t]\right),\right.$$
$$\left.(h-2\,j)\,(h+j-3\,nu)\,(h+j+3\,nu)\,f[0,t]\right\}$$

Both coordinates should be zero. The second coordinate shows that we can choose h=2j

```
In[ ]:= deq1 = deq /. h → 2 j // Simplify
```

$$\text{Out[ ]=}\ -\left(\left(-4+nu^2\right)f[0,t]\right)+t\left(-3\,f^{(0,1)}[0,t]+t\,f^{(0,2)}[0,t]\right)$$

Check solutions

```
In[ ]:=
        Clear[c1, c2]
        ff = c1 t^(2 + nu) + c2 t^(2 - nu)
        deq1 /. {f[0, t] → ff, f^(0,ee_)[0, t] :→ D[ff, {t, ee}]} // Simplify
```

$$\text{Out[ ]=}\ c2\,t^{2-nu}+c1\,t^{2+nu}$$

$$\text{Out[ ]=}\ 0$$

```
In[ ]:= ff = t^2 (c1 + c2 Log[t])
        deq1 /. nu → 0 /. {f[0, t] → ff, f^(0,ee_)[0, t] :→ D[ff, {t, ee}]} // Simplify
```

$$\text{Out[ ]=}\ t^2\,(c1+c2\,Log[t])$$

$$\text{Out[ ]=}\ 0$$