```
> restart;
> with(PDEtools):with(linalg):with(LinearAlgebra):with(plots):alias
  (w=w(z),phi=phi(t),psi=psi(t)):d:=-1/2:epsilon[3]:=1;
```

$$\varepsilon_3 := 1 \tag{1}$$

```
> P5:=(diff(w, z, z))-((1/(2*w)+1/(w-1))*(diff(w,z)^2)-1/z*diff(w,
  z)+(w-1)^2/z^2*(A*w+B/w)+C*w/z+d*w*(w+1)/(w-1));
```

$$P5 := \frac{\partial^2}{\partial z^2} w - \left(\frac{1}{2\,w} + \frac{1}{w-1} \right) \left(\frac{\partial}{\partial z} w \right)^2 + \frac{\frac{\partial}{\partial z} w}{z} - \frac{(w-1)^2 \left(A\,w + \frac{B}{w} \right)}{z^2} - \frac{C\,w}{z} + \frac{1}{2} \frac{w\,(w+1)}{w-1} \tag{2}$$

```
> w=factor(z/(-b+a-n)+(2*a-b-1-3*n)/(-b+a-n));
```

$$w = \frac{z + 2\,a - b - 1 - 3\,n}{-b + a - n} \tag{3}$$

```
> w=factor(-z/(-b+a-n)+(1+2*a-n-3*b)/(-b+a-n));
```

$$w = \frac{-z + 1 + 2\,a - n - 3\,b}{-b + a - n} \tag{4}$$

```
> w=factor(z/(a+n)+(3*n+2*a+1-b)/(a+n));
```

$$w = \frac{z + 3\,n + 2\,a + 1 - b}{a + n} \tag{5}$$

```
> w=factor(-z/(a+n)+(n+b+2*a-1)/(a+n));
```

$$w = \frac{-z + n + b + 2\,a - 1}{a + n} \tag{6}$$

```
> #H:={A=1/2*(b-a+n)^2,B=-1/2*a^2,C=1+n-b};
> #H:={A=(a+n)^2/2,B=-(b-a)^2/2,C=(b-n-1)};
> #solve(4*a+2*R*n-2*b-2-6*n+2*R*b-2*R*a,R);
```