```
> restart;alias(sigma=sigma(x),phi=phi(x),psi=psi(z)):with
  (PDEtools):with(plots):with(LinearAlgebra):with(linalg):Digits:=
  100:
> S6:=diff(sigma,x)*(x*(x-1)*diff(sigma,x,x))^2+(diff(sigma,x)*(2*
  sigma-(2*x-1)*diff(sigma,x))+nu[1]*nu[2]*nu[3]*nu[4])^2-product
  (diff(sigma,x)+nu[k]^2,k=1..4):
> a:=-4;c:=2;n:=2;
```

$$a := -4$$

$$c := 2$$

$$n := 2 \tag{1}$$

```
> nu[1] := 1/2-n-(1/2)*b+(1/2)*a:nu[2] := -1/2+c-(1/2)*b-(1/2)*a:nu
  [3] := 1/2+(1/2)*a-(1/2)*b:nu[4] := 1/2-(1/2)*a-(1/2)*b:
> phi:=simplify(expand(sort(hypergeom([a,b], [c], x))))*x^(b):
> phi:for K from 1 to n do;l[K]:=diff(%,x)*x*(x-1);od:wronskian(
  [phi,seq(l[k],k=1..n-1)],x):for K from 1 to n do;h[K]:=Row(%,1);
  row(%%,2);wronskian(%*x*(x-1),x):od:simplify(<seq(simplify(h[k]),
  k=1..n)>):tau:=collect(simplify(det(%)*x^(-n*b)*(x*(x-1))^((1-n)*
  (n/2))),x,factor):
> sigma:=convert(simplify(x*(x-1)*diff(ln(tau),x))+n/4*(4*a*x-2*c-
  a+1+b)-(1/4)*(1+a-b)^2*x+1/4*(-b+b^2+c-c*a-c*b+a+a^2),parfrac,x):
> A:=-1/4-(1/2)*a+(1/2)*b-(1/4)*a^2+(1/2)*b*a-(1/4)*b^2:B:= (1/4)*
  (a^3-n*a^2-a^2*c-a^2*b+2*a^2+a-2*b*a+2*n*c*a-2*n*b*a+b^2*a+2*b^2+
  n+c-n*b^2-b-2*b*c-b^3+b^2*c-2*n*c+2*n*c*b)/(-b+1+a):
```

Sigma approx

```
> PP:=sigma-A*x-B:
> animate( plot, [[PP],x=-0.6..1.6,color=blue,thickness=3],b=6..12,
  frames=100);
```

$b = 6.$