

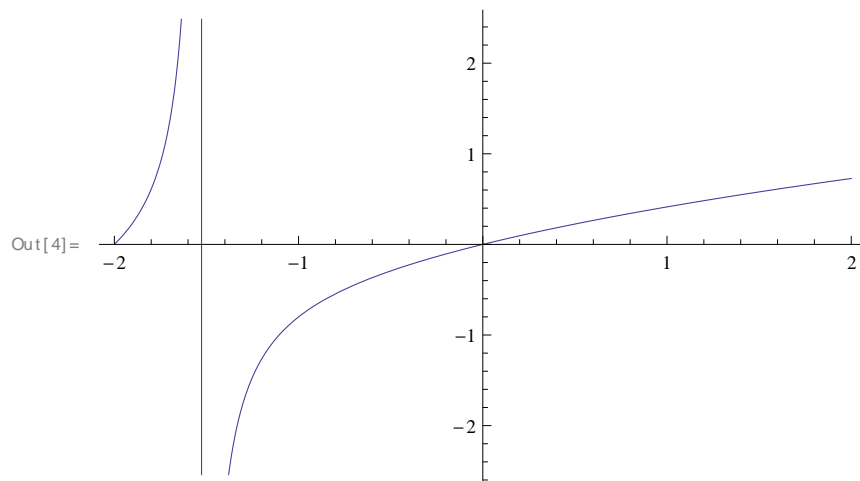
In[1]:= **f = Sqrt[1 + x] - 1**

Out[1]=  $-1 + \sqrt{1+x}$

In[3]:= **pa = PadeApproximant[f, {x, 0, {2, 2}}]**

Out[3]= 
$$\frac{\frac{x}{2} + \frac{x^2}{4}}{1 + \frac{3x}{4} + \frac{x^2}{16}}$$

In[4]:= **Plot[pa, {x, -2, 2}]**



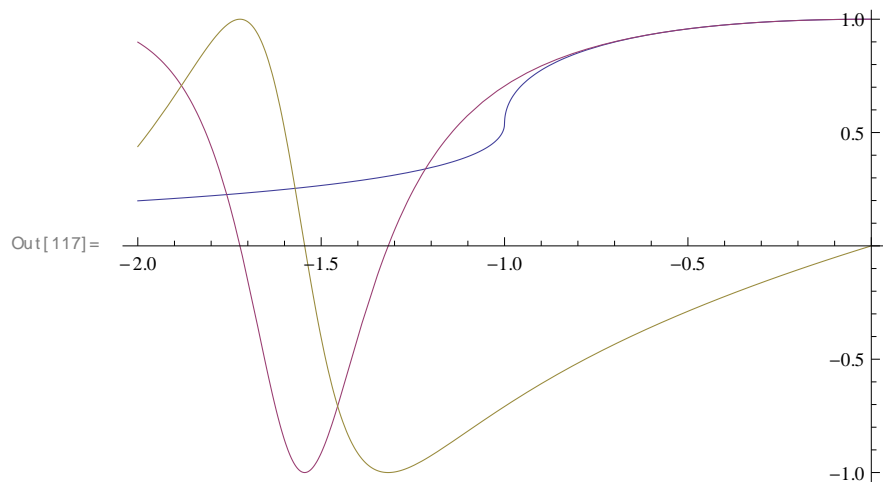
In[32]:= **g0 = Exp[I dz f]**

Out[32]=  $e^{i dz (-1 + \sqrt{1+x})}$

In[116]:= **pg = PadeApproximant[Exp[I dz f], {x, 0, {2, 2}}]**

Out[116]= 
$$\frac{(1.0000000000000000 + (0.6875 + 0.25 i) x + (0.0260417 + 0.109375 i) x^2)}{(1.0000000000000000 + (0.6875 - 0.25 i) x + (0.0260417 - 0.109375 i) x^2)}$$

In[117]:= **Plot[{Re[g0] /. dz -> 3.05, Re[pg] /. dz -> 3.05, Im[pg] /. dz -> 3.05}, {x, -2, 0}]**



In[111]:= **dz = 1.0;**

```
In[118]:= tab = Table[{x, Re[g0], Im[g0], Re[pg], Im[pg]}, {x, -2, 0, 0.001}];
```

```
In[119]:= OutputForm[TableForm[tab, TableSpacing -> {0, 2}]] >> pade_dz1-22.dat
```

```
In[124]:= pom = w'[x] + a1 (w'[x+dx] - 2 w'[x] + w'[x-dx]) - 1 / (2 dx) (w[x+dx] - w[x-dx])
```

```
Out[124]= -\frac{-w[-dx+x] + w[dx+x]}{2 dx} + w'[x] + a1 (-2 w'[x] + w'[-dx+x] + w'[dx+x])
```

```
In[131]:= Series[pom, {dx, 0, 4}]
```

```
Out[131]= \left(-\frac{1}{6} w^{(3)}[x] + a1 w^{(3)}[x]\right) dx^2 + \left(-\frac{1}{120} w^{(5)}[x] + \frac{1}{12} a1 w^{(5)}[x]\right) dx^4 + O[dx]^5
```

```
In[128]:= aux =
```

```
    w''[x] + a1 (w''[x+dx] - 2 w''[x] + w''[x-dx]) - 1 / (dx^2) (w[x+dx] - 2 w[x] + w[x-dx])
```

```
Out[128]= -\frac{-2 w[x] + w[-dx+x] + w[dx+x]}{dx^2} + w''[x] + a1 (-2 w''[x] + w''[-dx+x] + w''[dx+x])
```

```
In[132]:= Series[aux, {dx, 0, 4}]
```

```
Out[132]= \left(-\frac{1}{12} w^{(4)}[x] + a1 w^{(4)}[x]\right) dx^2 + \left(-\frac{1}{360} w^{(6)}[x] + \frac{1}{12} a1 w^{(6)}[x]\right) dx^4 + O[dx]^5
```