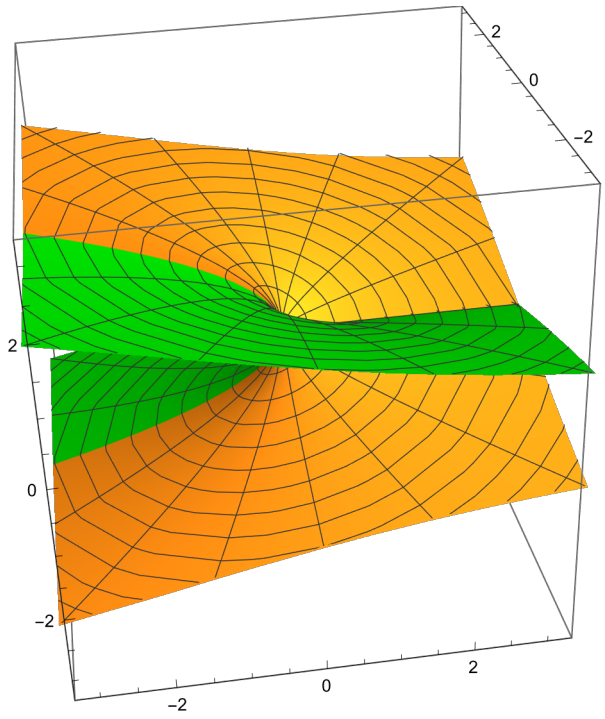
$$\sqrt{z}$$

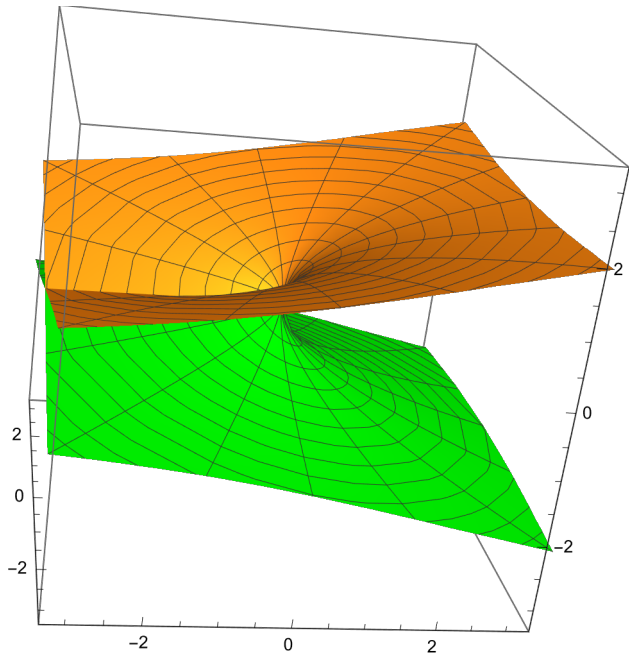
In[ ]:=
```
Show[ ParametricPlot3D[
   {r Cos[t], r Sin[t], Im[r^(1 / 2) E^(I t / 2)]}, {r, 0, 6}, {t, -Pi, Pi} ],
 ParametricPlot3D[ {r Cos[t], r Sin[t], Im[r^(1 / 2) E^(I t / 2)]}, {r, 0, 6},
   {t, Pi, 3 Pi} , PlotStyle → Green], PlotRange → {{-3, 3}, {-3, 3}, {-3, 3}}]
```

Out[ ]=



In[ ]:=
```
Show[ ParametricPlot3D[
   {r Cos[t], r Sin[t], Re[r^(1 / 2) E^(I t / 2)]}, {r, 0, 6}, {t, -Pi, Pi} ],
  ParametricPlot3D[ {r Cos[t], r Sin[t], Re[r^(1 / 2) E^(I t / 2)]}, {r, 0, 6},
   {t, Pi, 3 Pi} , PlotStyle → Green], PlotRange → {{-3, 3}, {-3, 3}, {-3, 3}}]
```

Out[ ]=

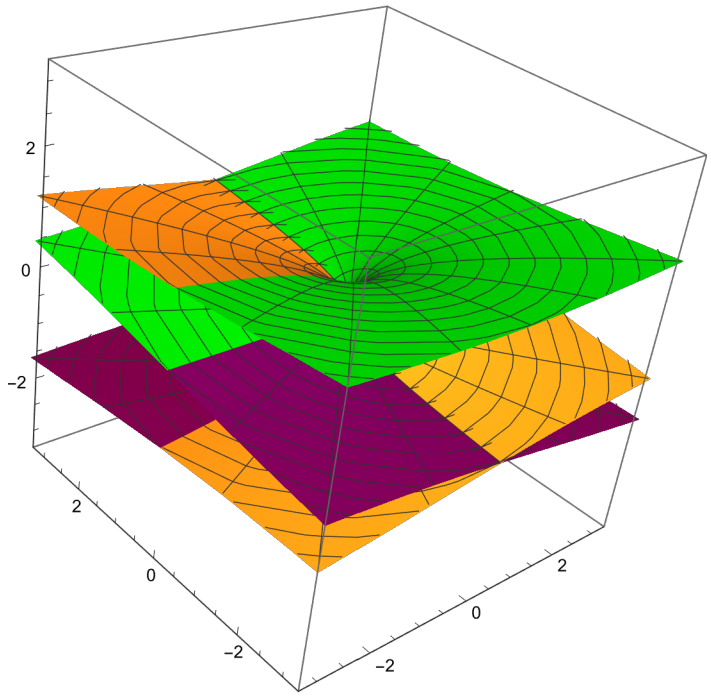


$$z^{1/3}$$

In[ ]:=
```
Show[ ParametricPlot3D[
  {r Cos[t], r Sin[t], Im[r^(1 / 3) E^(I t / 3)]}, {r, 0, 6}, {t, -Pi, Pi} ],
 ParametricPlot3D[ {r Cos[t], r Sin[t], Im[r^(1 / 3) E^(I t / 3)]},
  {r, 0, 6}, {t, Pi, 3 Pi} , PlotStyle → Green],

 ParametricPlot3D[ {r Cos[t], r Sin[t], Im[r^(1 / 3) E^(I t / 3)]}, {r, 0, 6},
  {t, 3 Pi, 5 Pi} , PlotStyle → Purple], PlotRange → {{-3, 3}, {-3, 3}, {-3, 3}}]
```

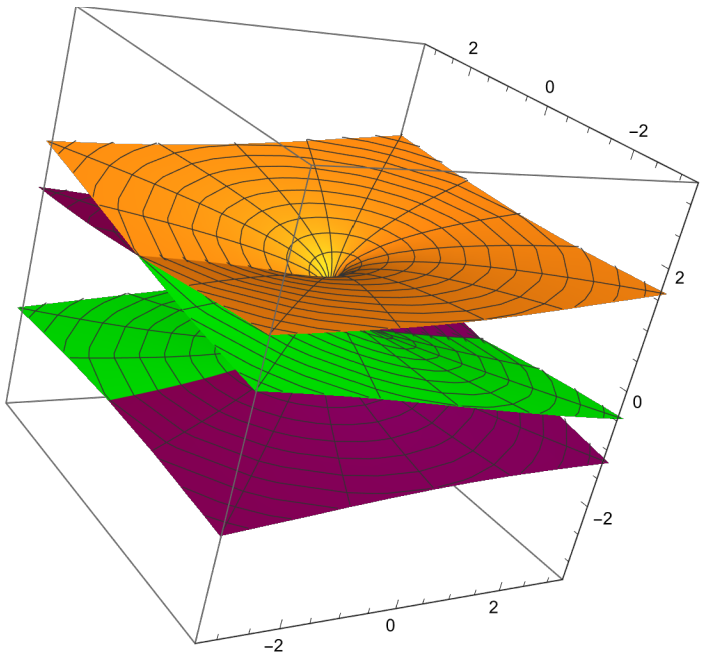
Out[ ]=



In[ ]:=
```
Show[ ParametricPlot3D[
  {r Cos[t], r Sin[t], Re[r^(1 / 3) E^(I t / 3)]}, {r, 0, 6}, {t, -Pi, Pi} ],
 ParametricPlot3D[ {r Cos[t], r Sin[t], Re[r^(1 / 3) E^(I t / 3)]},
  {r, 0, 6}, {t, Pi, 3 Pi} , PlotStyle → Green],

 ParametricPlot3D[ {r Cos[t], r Sin[t], Re[r^(1 / 3) E^(I t / 3)]}, {r, 0, 6},
  {t, 3 Pi, 5 Pi} , PlotStyle → Purple], PlotRange → {{-3, 3}, {-3, 3}, {-3, 3}}]
```

Out[ ]=



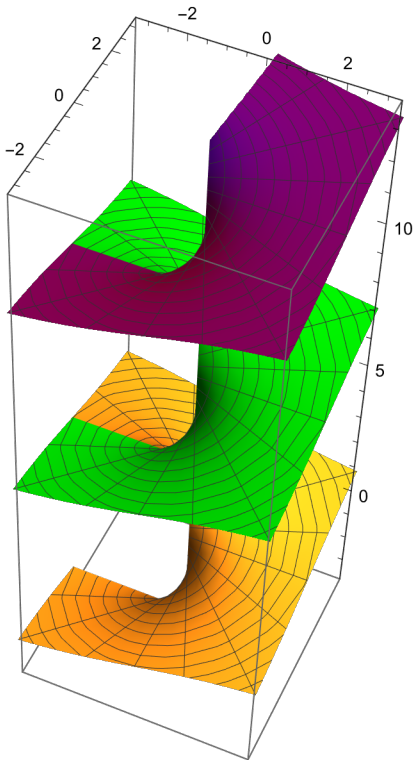
log(z)

Il logaritmo (o potenze irrazionali di z) forniscono esempi di punti di diramazione collegati a un numero di fogli infinito.

In[ ]:=
```
Show[ ParametricPlot3D[ {r Cos[t], r Sin[t], Im[Log[r] + I t]}, {r, 0, 6},
  {t, -Pi, Pi} ], ParametricPlot3D[ {r Cos[t], r Sin[t], Im[Log[r] + I t]},
  {r, 0, 6}, {t, Pi, 3 Pi} , PlotStyle → Green],

 ParametricPlot3D[ {r Cos[t], r Sin[t], Im[Log[r] + I t]}, {r, 0, 6},
  {t, 3 Pi, 5 Pi} , PlotStyle → Purple], PlotRange → {{-3, 3}, {-3, 3}, {-3, 13}}]
```

Out[ ]=



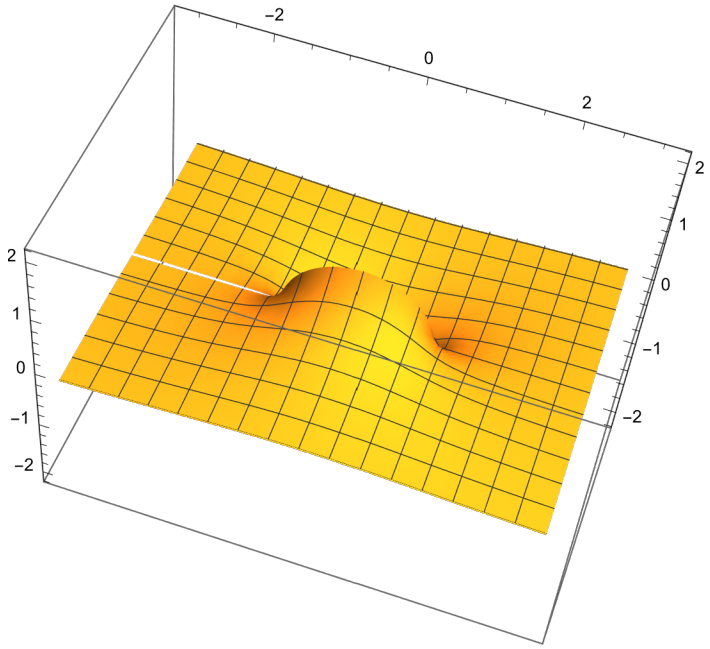
$$z - \sqrt{(z-1)(z+1)}$$

Esempio di funzione con due fogli connessi da due punti di diramazione -1 e 1 , di tipo radice quadrata.

Vediamo prima come definire due fogli A e B che abbiano un taglio tra i punti -1 e 1.

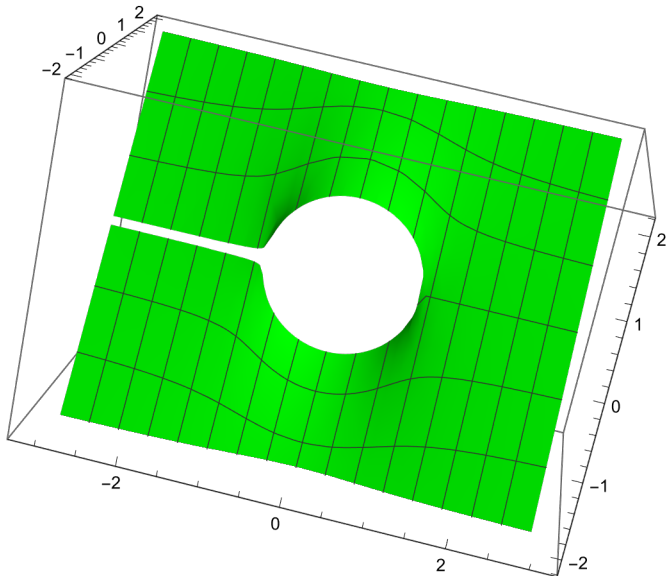
In[ ]:=
```
A =
 Show[ ParametricPlot3D[ {x, y, Im[x + I y - Sqrt[(x + I y - 1)] Sqrt[ (x + I y + 1)]]},
   {x, -3, 3}, {y, -3, 3} ] , PlotRange → {{-3, 3}, {-2, 2}, {-2, 2}}]
```

Out[ ]=



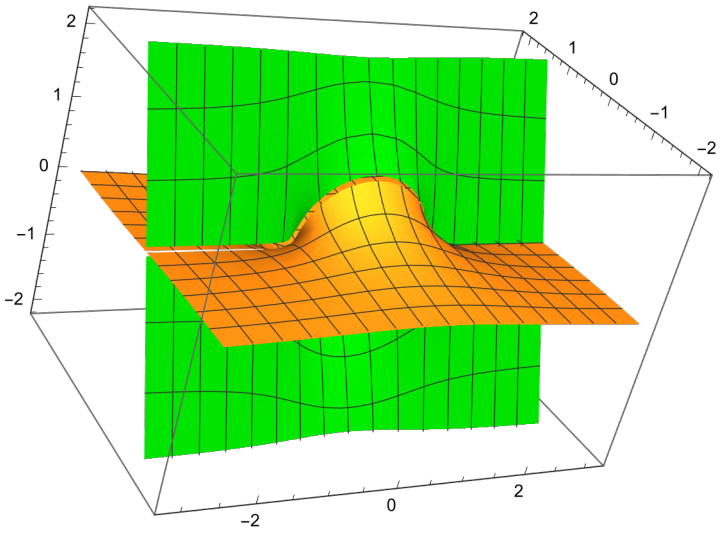
In[ ]:=
```
B = Show[ ParametricPlot3D[
   {x, y, Im[x + I y + Sqrt[(x + I y - 1)] Sqrt[ (x + I y + 1)]]}, {x, -3, 3},
   {y, -3, 3}, PlotStyle → Green ] , PlotRange → {{-3, 3}, {-2, 2}, {-2, 2}}]
```

Out[ ]=



In[ ]:=
```
Show[A, B]
```

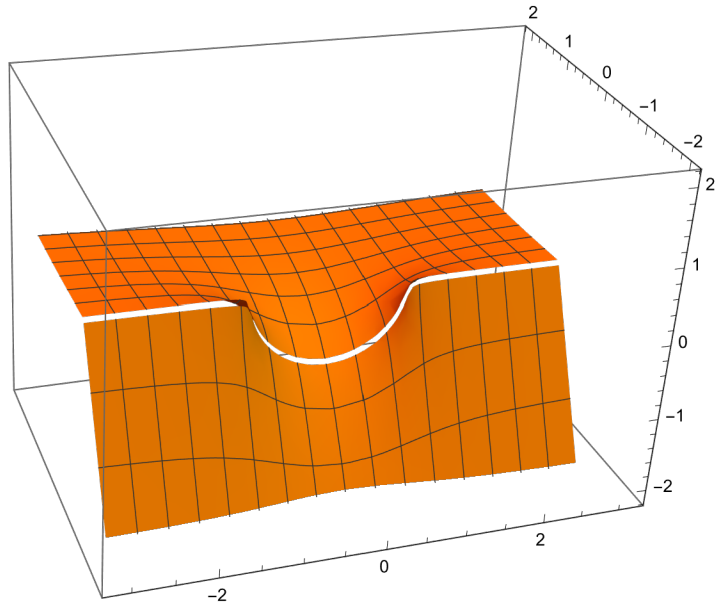
Out[ ]=



La stessa superficie si puo` rappresentare con tagli “lunghi”, definendo due diverse “sezioni”.

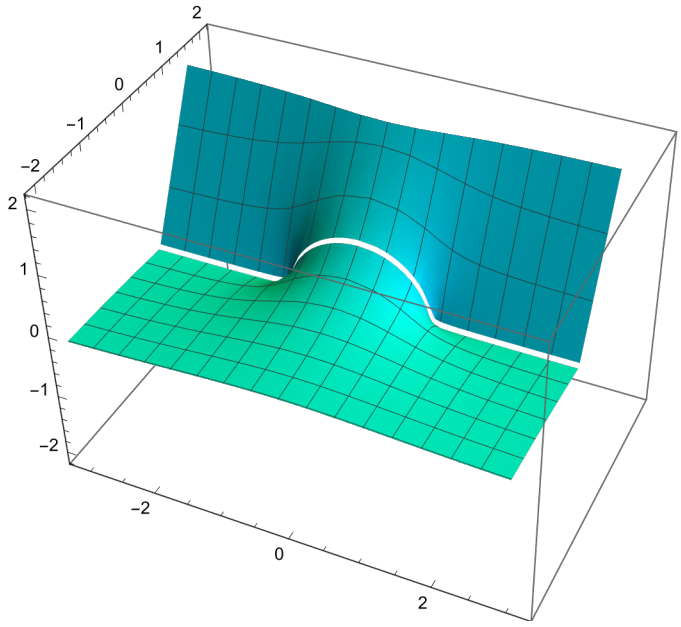
In[ ]:=
```
CC = Show[ ParametricPlot3D[
    {x, y, Im[x + I y - I Sqrt[(x + I y - 1)] Sqrt[ - (x + I y + 1)]]}, {x, -3, 3},
    {y, -3, 3}, PlotStyle → Orange] , PlotRange → {{-3, 3}, {-2, 2}, {-2, 2}}]
```

Out[ ]=



In[ ]:=
```
DD = Show[ ParametricPlot3D[
    {x, y, Im[x + I y + I Sqrt[(x + I y - 1)] Sqrt[ - (x + I y + 1)]]}, {x, -3, 3},
    {y, -3, 3}, PlotStyle → Cyan] , PlotRange → {{-3, 3}, {-2, 2}, {-2, 2}}]
```

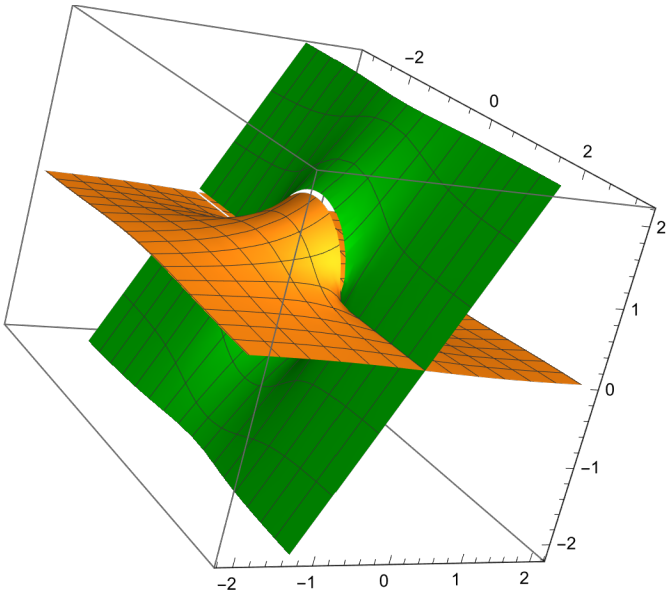
Out[ ]=



I due fogli A e B oppure C e D danno sezioni diverse della stessa superficie di Riemann complessiva.

In[ ]:=
```
Show[A, B]
```

Out[ ]=



In[ ]:=
```
Show[CC, DD]
```

Out[ ]=