

## 3

## KURBEN ADIERAZPENA FORMA INPLIZITUAN, MAILA KURBAK

### 3.1. Forma implizituan emandako funtzioak

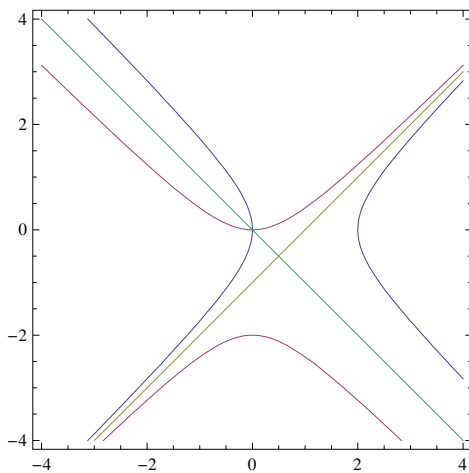
Agindu hau  $f(x,y)=0$  forma implizituan emandako funtzioa ardatz koordinatu errektangeluar bidimensionaleko OXY sistema batean irudikatzeko erabiltzen da.

#### ▼ ContourPlot funtzioa

Ardatz koordinatu berdinak erabilita funtzio bat baino gehiagoren adierazpen grafikoa egin daiteke

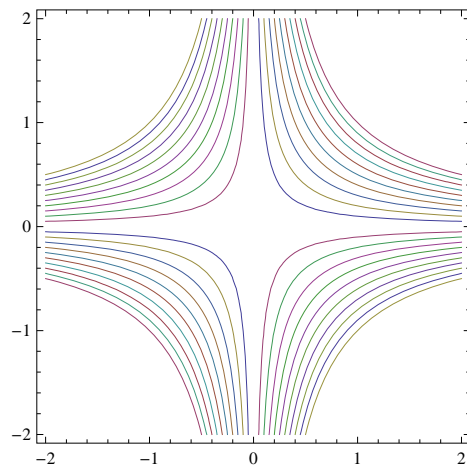
★ **ContourPlot** [ {ekuazioa1,ekuazioa2,....,ekuazioan} , {x,xmin,xmax} , {y,ymin,ymax} ]

```
ContourPlot[ {x^2 - y^2 == 2 x, -x^2 + y^2 == -2 y, y == x - 1, y == -x}, {x, -4, 4}, {y, -4, 4} ]
```



### ▼ Kurba familia baten grafikoa

```
ContourPlot[Evaluate[Table[{x * y == 0.1 * k, x * y == -0.1 * k}, {k, 1, 10}]],
{x, -2, 2}, {y, -2, 2}]
```

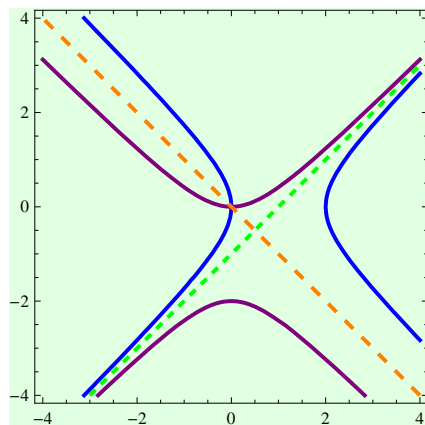


### ▼ ContourPlot funtzioaren aukerak

Plot funtzioan lehenetsitako ezaugarriak aldatu ahal izateko gehitzen zaizkion aukeretako batzuk ContourPlot funtzioari ere gehitu ahal zaizkio. PlotStyle aukera ContourPlot funtziora ContourStyle bezala egokitzen da

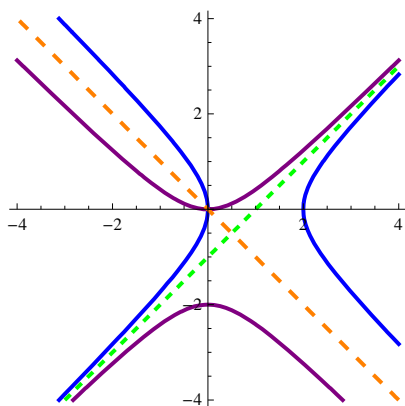
★ Hondoaren estiloa eta kolorea : ContourStyle → {kolorea, Thickness[n], Dashing[n]},  
Background → Kolorea

```
ContourPlot[{x^2 - y^2 == 2 x, -x^2 + y^2 == -2 y, y == x - 1, y == -x},
{x, -4, 4}, {y, -4, 4}, ContourStyle → {{Blue, Thickness[0.01]},
{Purple, Thickness[0.01]}, {Green, Thickness[0.01], Dashing[0.02]},
{Orange, Thickness[0.01], Dashing[0.03]}}, Background → LightGreen]
```



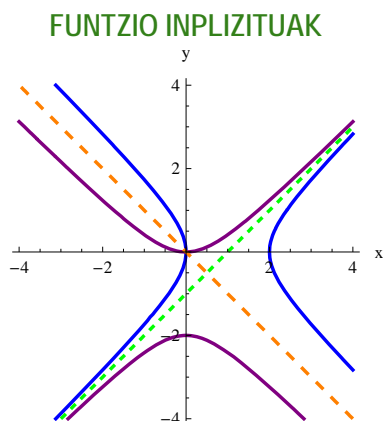
## ★ Markoa eta ardatzak

```
ContourPlot[{x^2 - y^2 == 2 x, -x^2 + y^2 == -2 y, y == x - 1, y == -x}, {x, -4, 4},
  {y, -4, 4}, ContourStyle -> {{Blue, Thickness[0.01]}, {Purple, Thickness[0.01]},
  {Green, Thickness[0.01], Dashing[0.02]}, {Orange, Thickness[0.01], Dashing[0.03]}},
  Axes -> True, Frame -> False, AspectRatio -> Automatic]
```



## ★ Etiketak

```
ContourPlot[{x^2 - y^2 == 2 x, -x^2 + y^2 == -2 y, y == x - 1, y == -x}, {x, -4, 4},
  {y, -4, 4}, ContourStyle -> {{Blue, Thickness[0.01]}, {Purple, Thickness[0.01]},
  {Green, Thickness[0.01], Dashing[0.02]}, {Orange, Thickness[0.01], Dashing[0.03]}},
  Axes -> True, Frame -> False, AxesLabel -> {"x", "y"}, PlotLabel ->
  style["FUNTZIO INPLIZITUAK", 16, Bold, RGBColor[0.2, 0.5, 0.1]], AspectRatio -> Automatic]
```

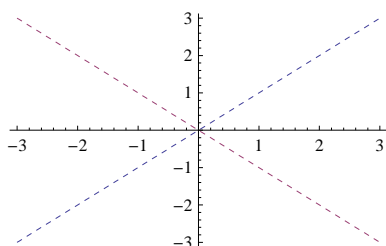


## ▼ Grafikoen konbinazioak

Aurretik definitutako grafikoen konbinazioak adieraztea posible egiten du

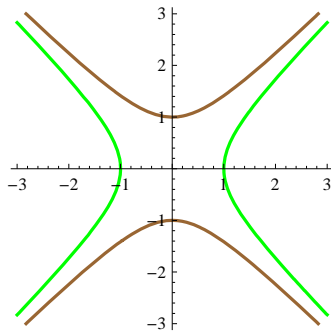
## ★ Show [grafikoa1, grafikoa2,...]

```
grafikoa1 = Plot[{x, -x}, {x, -3, 3}, PlotStyle -> Dashing[0.015]]
```

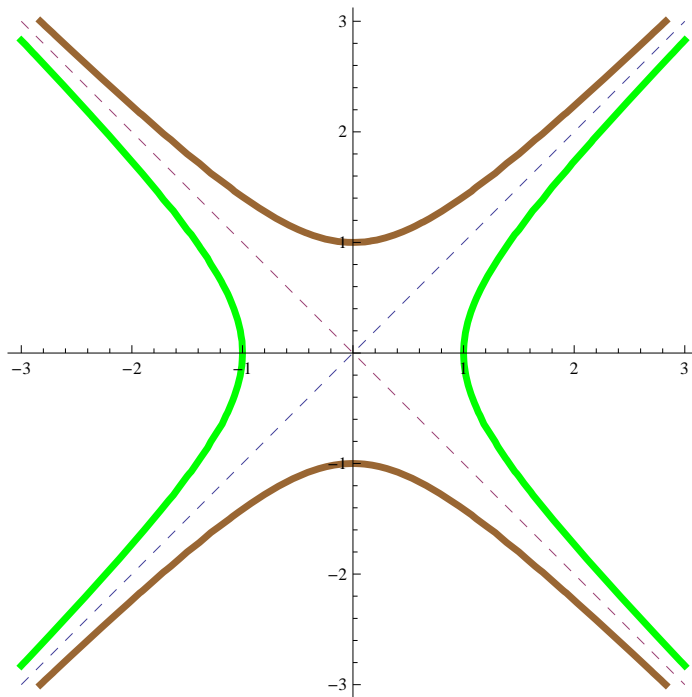


## ★ Grafikoen itxura aldatzeko zenbait aukera

```
grafikoa2 =  
ContourPlot[{x^2 - y^2 == 1, -x^2 + y^2 == 1}, {x, -3, 3}, {y, -3, 3}, Axes → True,  
Frame → False, ContourStyle → {{Green, Thickness[0.01]}, {Brown, Thickness[0.01]}}
```



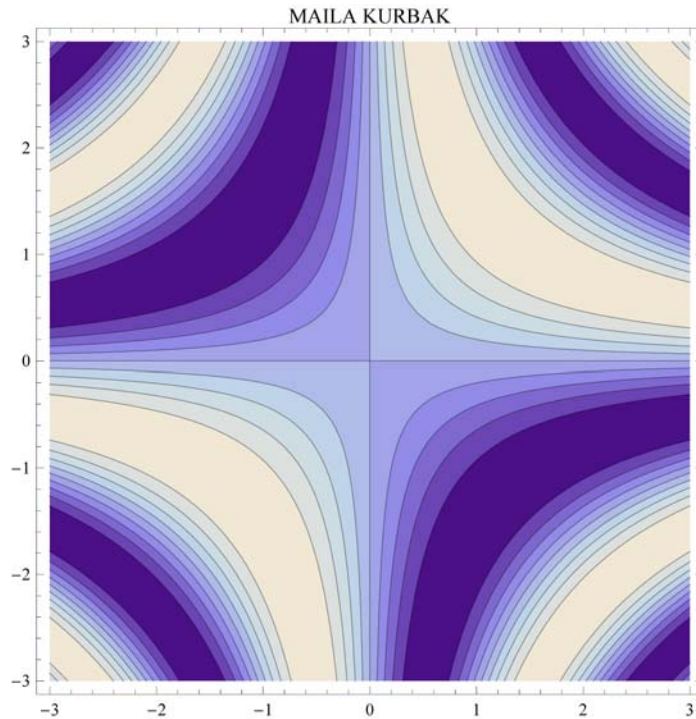
```
Show[grafikoa1, grafikoa2, AspectRatio → Automatic]
```



## 3.2. Bi aldagaitako funtzio baten maila kurbak

### ▼ Maila kurbak

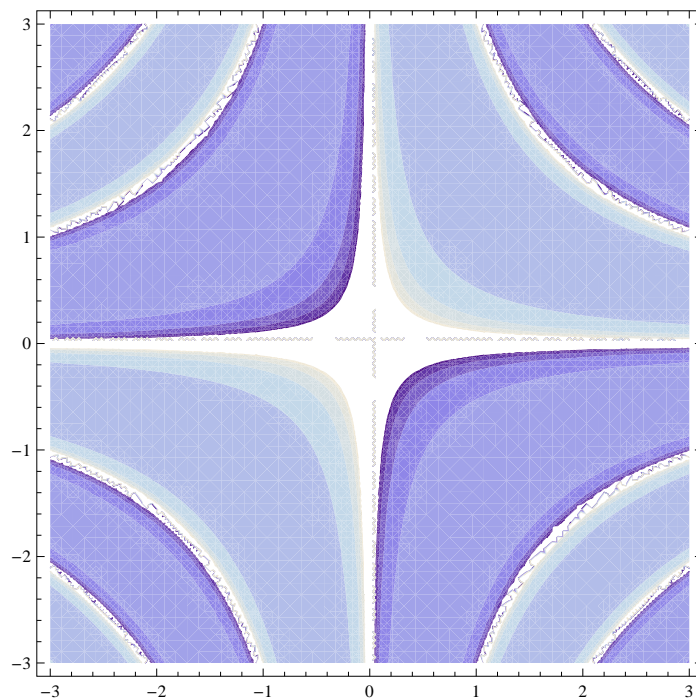
```
ContourPlot[Sin[x * y], {x, -3, 3}, {y, -3, 3}, PlotLabel -> "MAILA KURBAK"]
```



### ▼ Contourstyle-en beste aukera batzuek

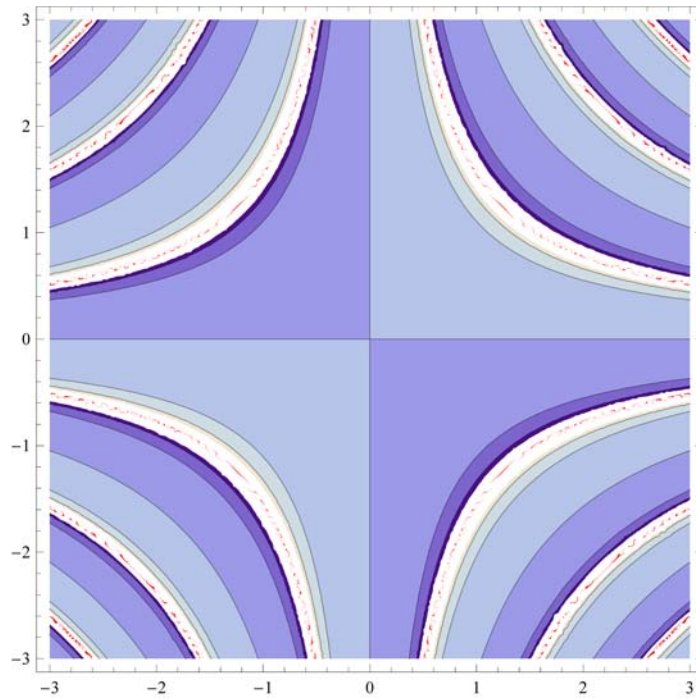
#### ★ ContourStyle→None

```
ContourPlot[1 / Sin[x * y], {x, -3, 3}, {y, -3, 3}, ContourStyle -> None]
```



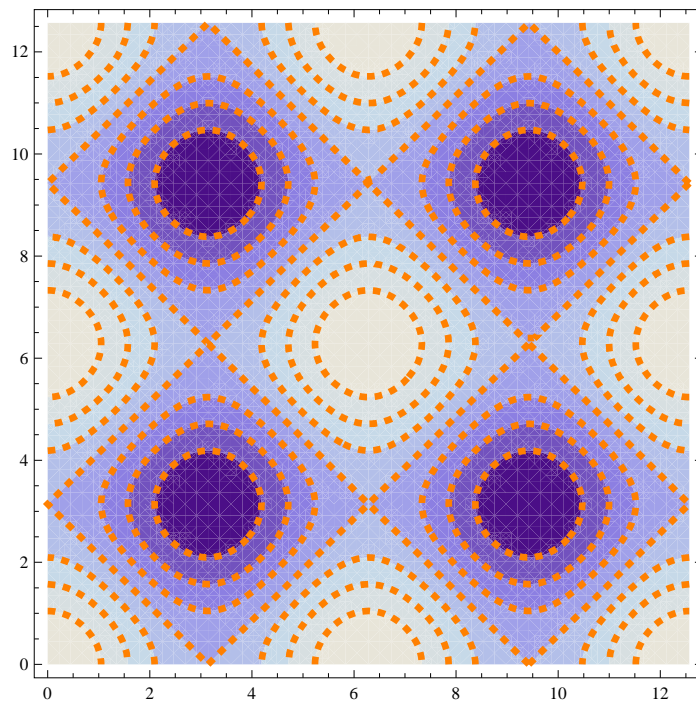
## ★ Exclusions

```
ContourPlot[Tan[x * y], {x, -3, 3}, {y, -3, 3},  
Exclusions -> Cos[x * y] == 0, ExclusionsStyle -> Red]
```



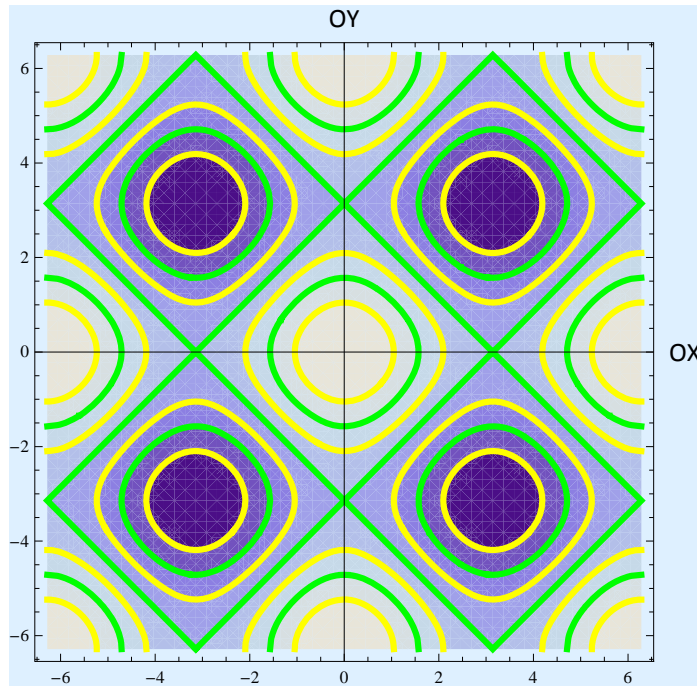
## ★ ContourStyle -&gt; Directive[Kolorea, Lodiera, Marra mota]

```
ContourPlot[Cos[x] + Cos[y], {x, 0, 4 Pi}, {y, 0, 4 Pi},  
ContourStyle -> Directive[Orange, Thickness[0.01], Dashed]]
```



## ★ Maila kurbetan koloreak txandakatuz

```
ContourPlot[Cos[x] + Cos[y], {x, -2 π, 2 π}, {y, -2 π, 2 π},
  ContourStyle -> {{Thickness[0.01], Yellow}, {Thickness[0.01], Green}},
  Axes -> True, AxesLabel -> {"OX", "OY"}, Background -> LightBlue]
```



## ★ PlotRange

```
g1 = ContourPlot[x^2 - y^2, {x, -4, 4}, {y, -4, 4},
  ContourStyle -> {{Thickness[0.01], Red}, {Thickness[0.01], Blue}}, Axes -> True];
g2 = ContourPlot[x^2 - y^2, {x, -4, 4}, {y, -4, 4},
  ContourStyle -> {{Thickness[0.01], Red}, {Thickness[0.01], Blue}},
  Axes -> True, PlotRange -> {-2, 2}];
```

GraphicsGrid[{{g1}, {g2}}]

