

## 8

## GRAFIKOEN ANIMAZIOA

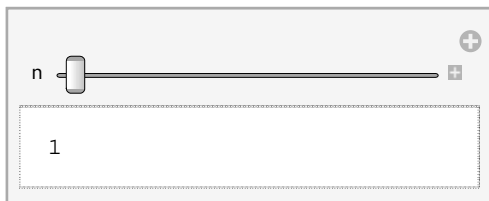
## 8.1. Manipulate

▼ Oinarrizko komandoa: `Manipulate[adierazpena, {u, umin, umax}], ]`

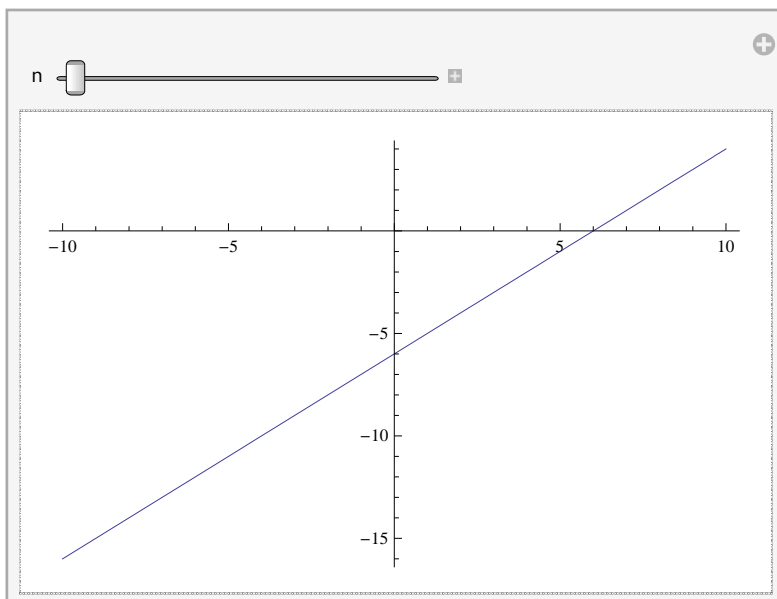
Komando honek grafikoen animazioak sortzea ahalbidetzen du, era interaktiboan kontrola daitekeen parametro baten balioa aldaraziz. Orokorrean, parametro baten menpeko adierazpen bat dinamikoki bistara daiteke.

## ★ Parametroen erabilera

```
Clear["Global`*"]  
Manipulate[n, {n, 1, 100}]
```

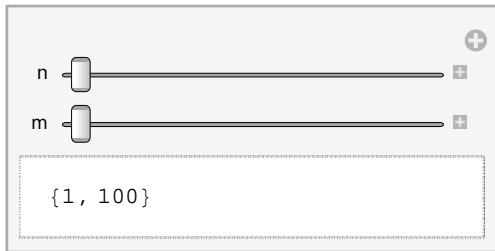


```
Manipulate[Plot[x + n, {x, -10, 10}], {n, -6, 6}]
```

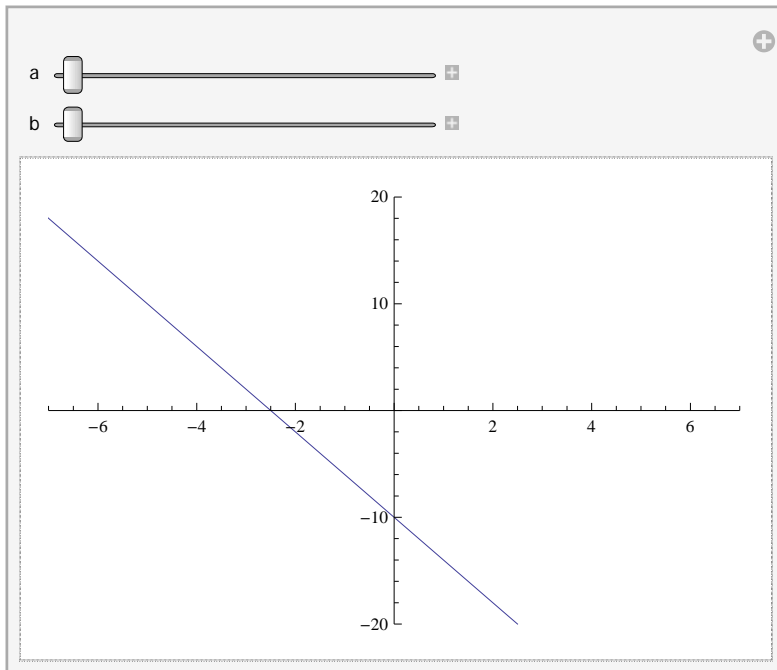


## ★ Parametro bat baino gehiagoren erabilera

```
Manipulate[{n, m}, {n, 1, 100}, {m, 100, 1}]
```



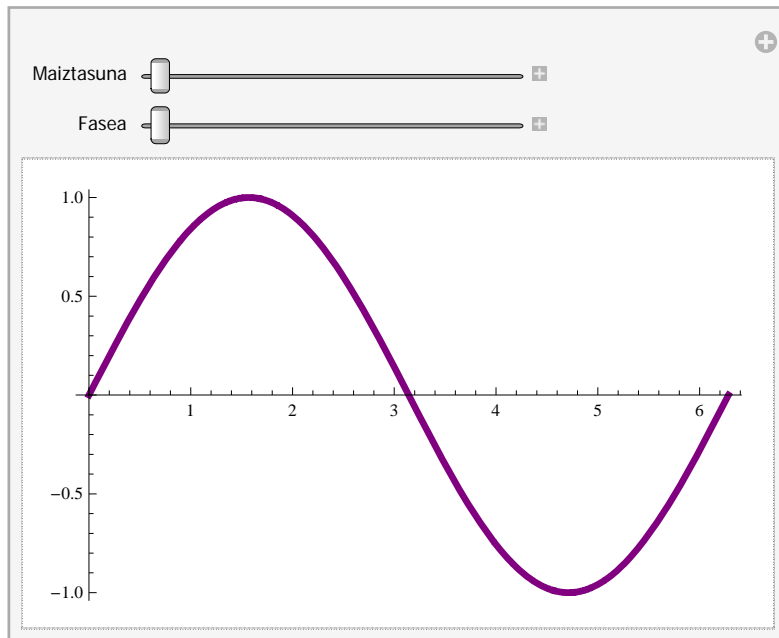
```
Manipulate[Plot[a * x + b, {x, -10, 10}, PlotRange -> {{-7, 7}, {-20, 20}}],  
{a, -4, 4}, {b, -10, 10}]
```



## ▼ Manipulate[ ] komandoaren zenbait aukera

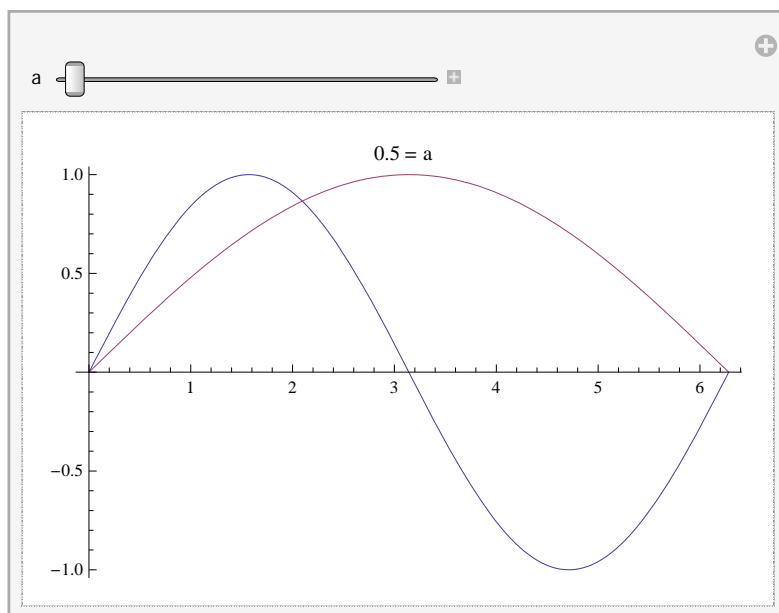
### ★ Kontrol-barrak

```
Manipulate[Plot[{Sin[x], Sin[a + b x]}, {x, 0, 2 Pi},
  PlotStyle -> {{Blue, Dashing[0.02]}, {Purple, Thickness[0.01]}},
  {{b, 1, "Maiztasuna"}, 1, 10}, {{a, 0, "Fasea"}, 0, 2 Pi}]
```



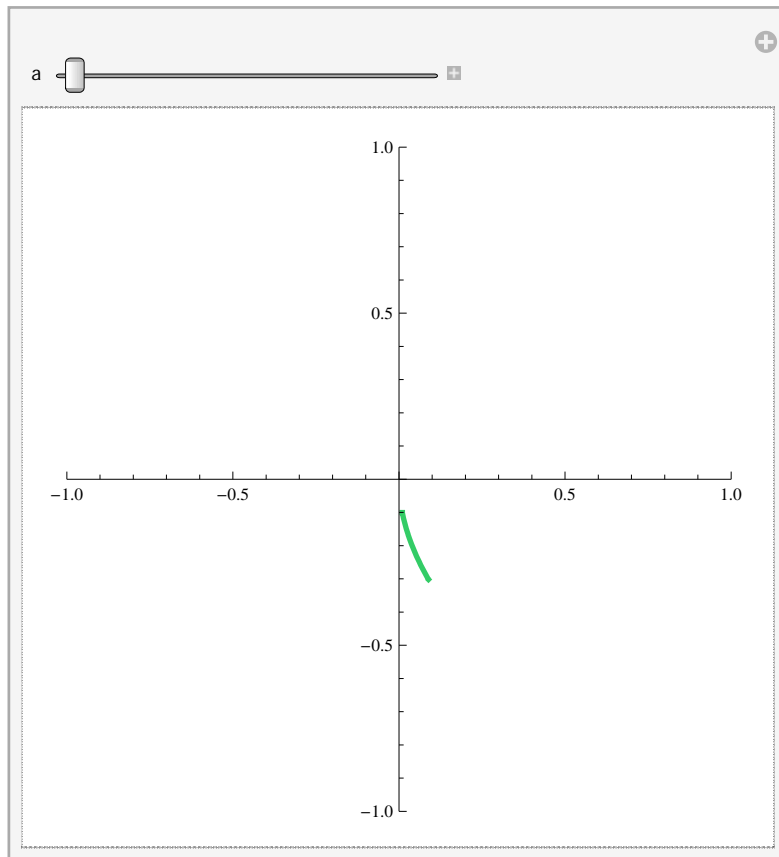
### ★ Plot[ ] komandoaren aukeren erabilera: etiketak, eremua

```
Manipulate[Plot[{Sin[x], Sin[a x]}, {x, 0, 6.28}, PlotLabel -> a "= a "], {a, 0.5, 2}]
```



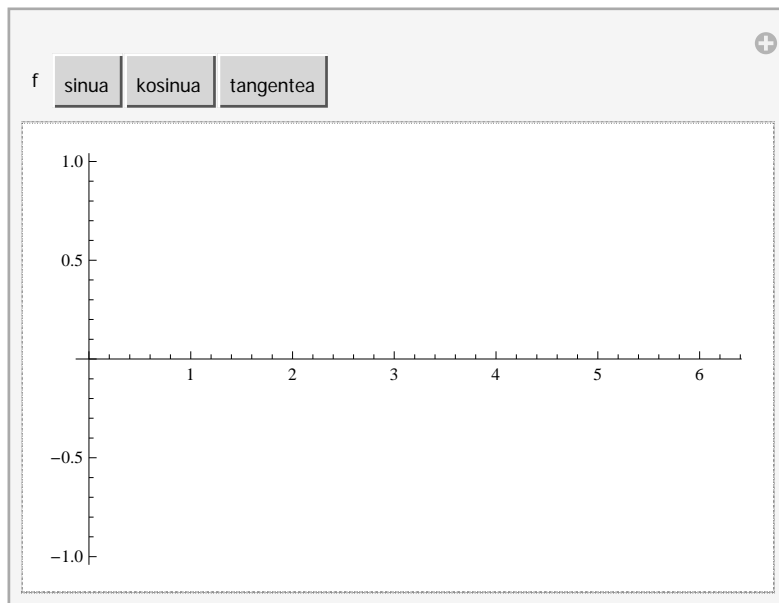
- ★ **Koordenatu parametrikotan emandako grafiko baten eremuaren manipulazioa egin daiteke zelan marrazten den ikusteko**

```
Manipulate[ParametricPlot[{ $\frac{t}{1+t^3}$ ,  $\frac{t^2}{1+t^3}$ }, {t, -10, a}, ExclusionsStyle -> Dashed,  
Exclusions -> {1+t^3 == 0}, PlotStyle -> {RGBColor[0.2, 0.8, 0.4], Thickness[0.008]},  
PlotRange -> {{-1, 1}, {-1, 1}}, {a, -3.4, 10, 0.05}]
```



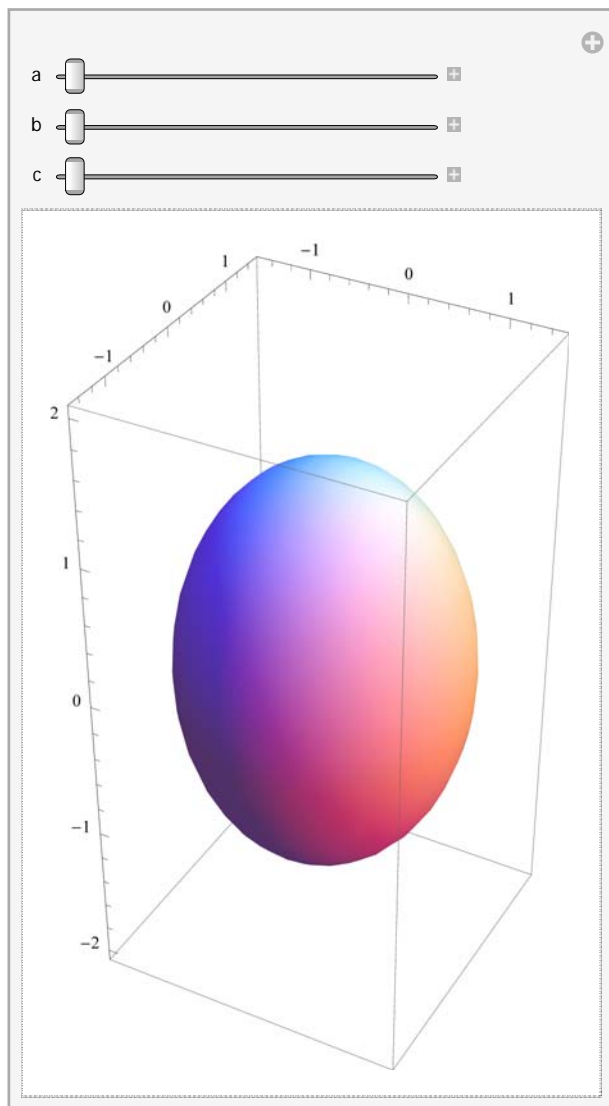
## ★ Grafiko asko bistara daitezke kontrol-botoiak erabilita

```
Manipulate[Plot[f[x], {x, 0, 2 Pi}],  
  {f, {Sin → "sinua", Cos → "kosinua", Tan → "tangentea"}}]
```



## ★ 3D-ko grafikoen animazioa

```
Manipulate[ContourPlot3D[a * x^2 + b * y^2 + c * z^2 == 1, {x, -1.5, 1.5}, {y, -1.5, 1.5},
  {z, -2, 2}, BoxRatios -> {1, 1, 2}, Mesh -> None], {a, 0.5, 4}, {b, 0.5, 4}, {c, 0.5, 4}]
```

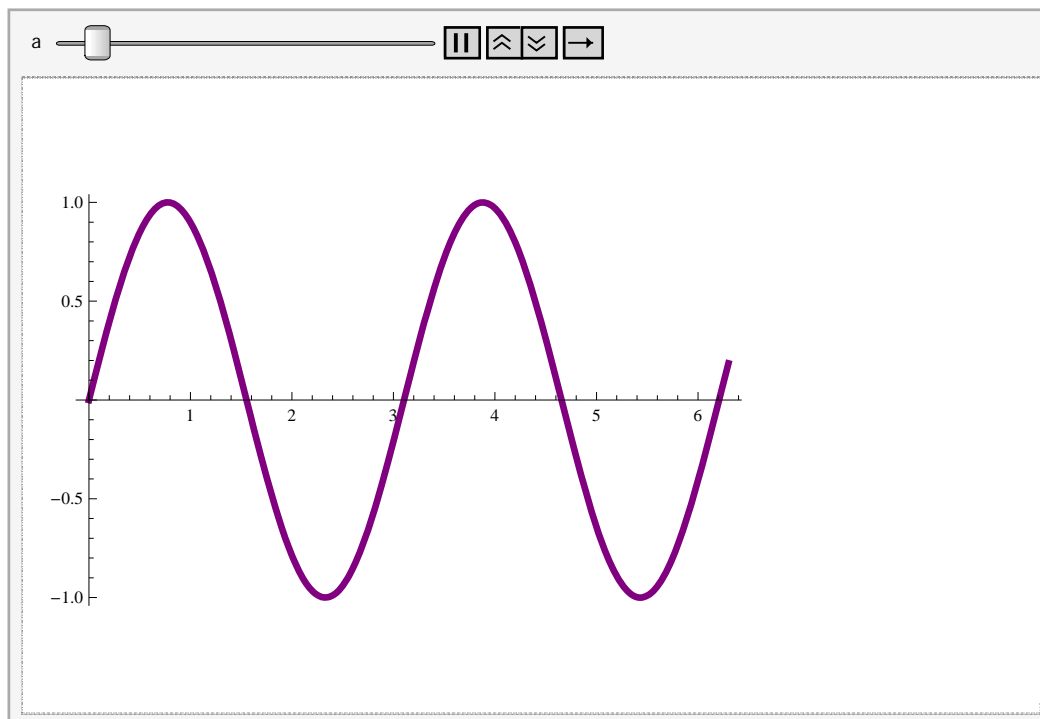


## 8.2. Animate

### ▼ Oinarrizko komandoa: `Animate[adierazpena, {u, umin, umax}], ]`

Komando honek grafikoen animazioak sortzea ahalbidetzen du, era interaktiboan kontrola daitekeen parametro baten balioa aldaraziz. Manipulate komandoaren antzera funtzionatzen du. Kontrakorik esan ezean ebaluatzen denean hasten da animazioa.

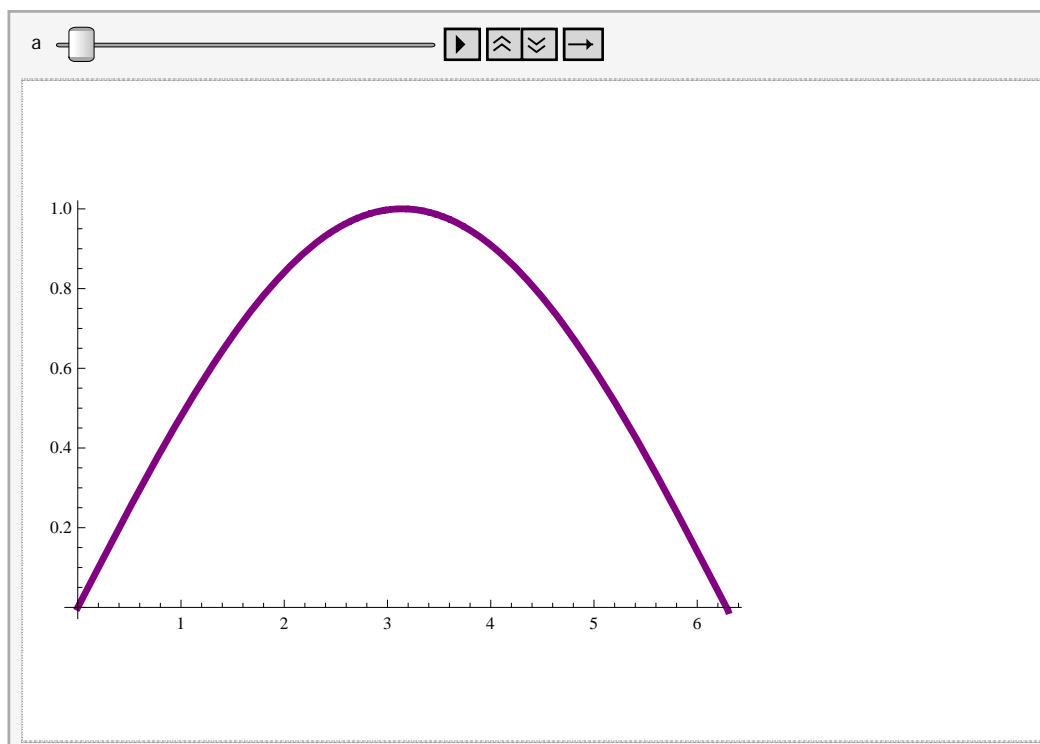
```
Animate[Plot[Sin[a * x], {x, 0, 6.3}, PlotStyle -> {Purple, Thickness[0.01]}], {a, 1, 10}]
```



### ▼ Animate[ ] komandoaren zenbait aukera

★ **AnimationRunning -> False:** aukera honekin animazioa pausaz hasten da

```
Animate[Plot[Sin[a * x], {x, 0, 6.3}, PlotStyle -> {Purple, Thickness[0.01]}],  
{a, 0.5, 5}, AnimationRunning -> False]
```



## ★ Kontrolen kokapena: Left, Right, Top, Bottom

```
Animate[Plot[Sin[a * x], {x, 0, 6.3}, PlotStyle -> {Purple, Thickness[0.01]}],  
{a, 0.5, 5}, AnimationRunning -> False, ControlPlacement -> Bottom]
```

