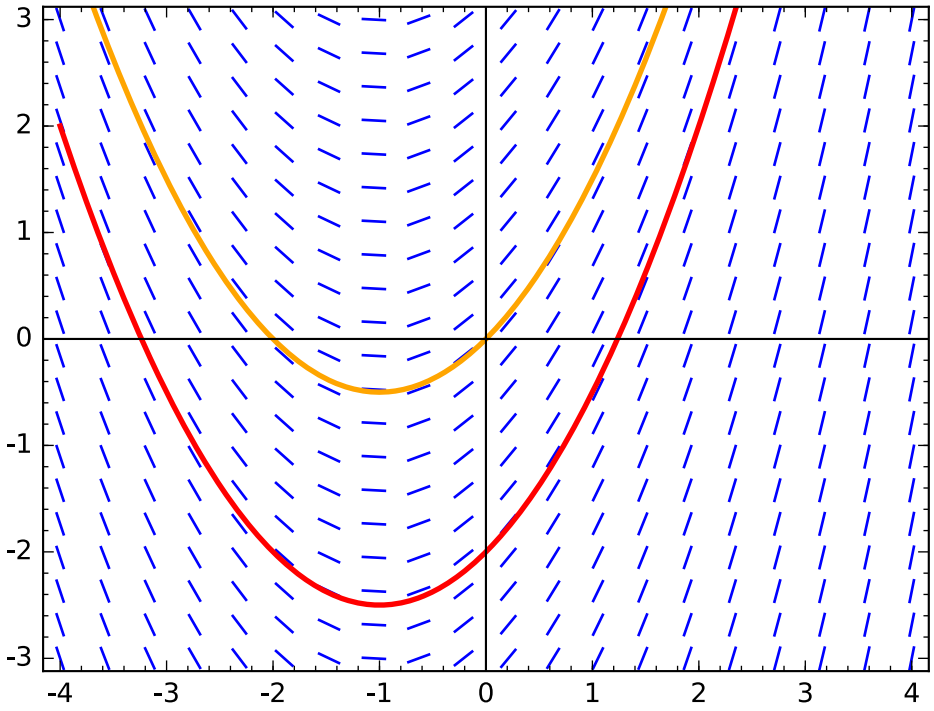
Feuille d'exercices 5

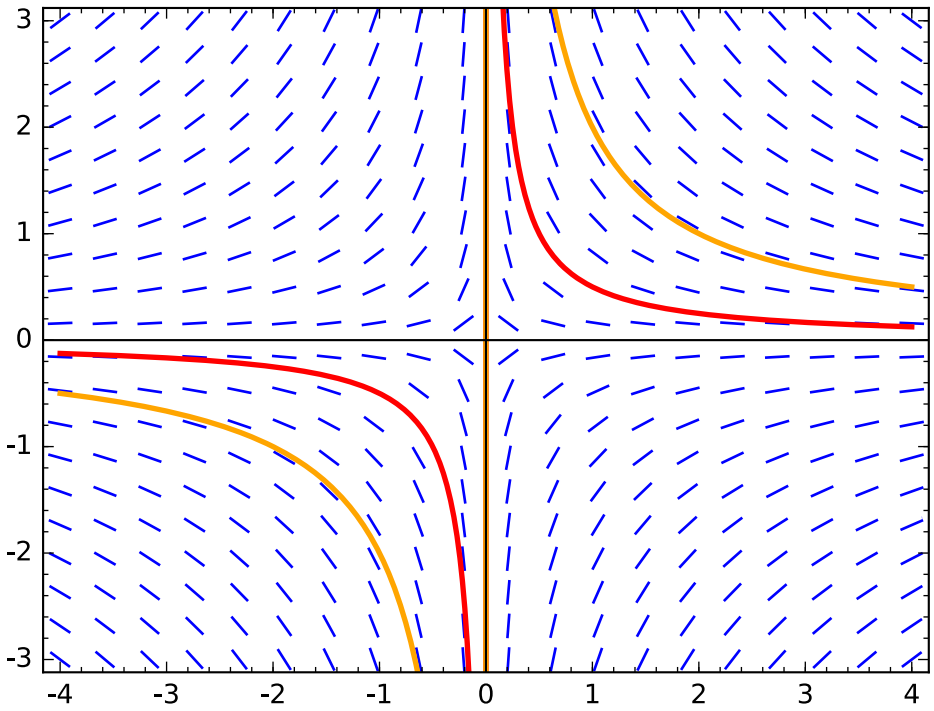
bw35va bw

29/11/2016

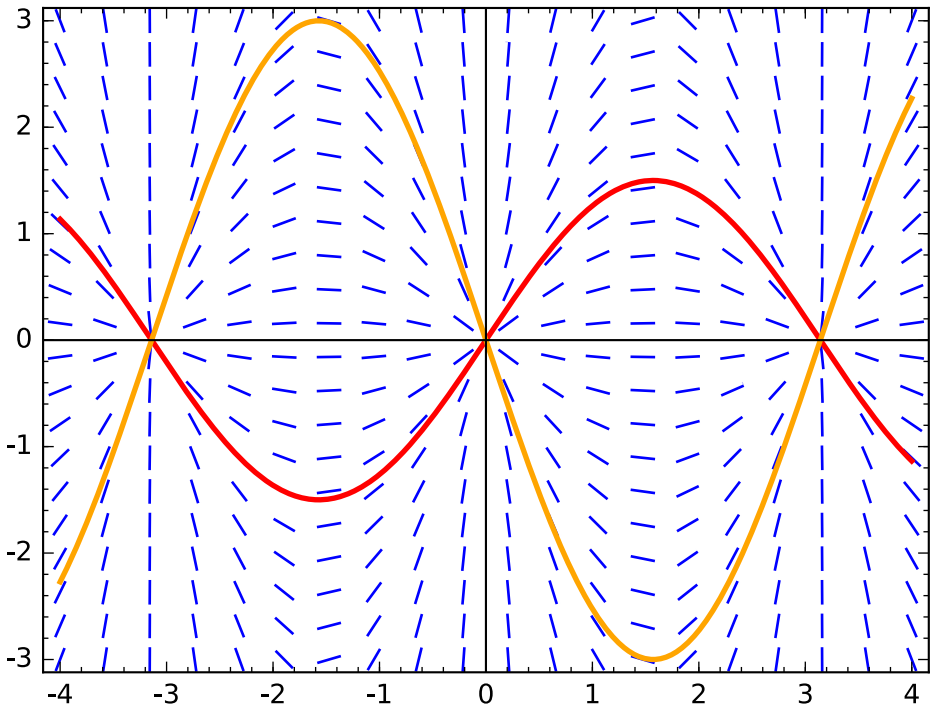
```
# Exercice 1(a)
x = var('x'); y = var('y')
g = plot_slope_field(1+x, (x,-4,4), (y,-3,3), color='blue')
g += plot(x+x^2/2-2, x, -4, 4, color='red', thickness=2)
g += plot(x+x^2/2, x, -4, 4, color='orange', thickness=2)
g.show(aspect_ratio=1, ymin=-3, ymax=3)
```



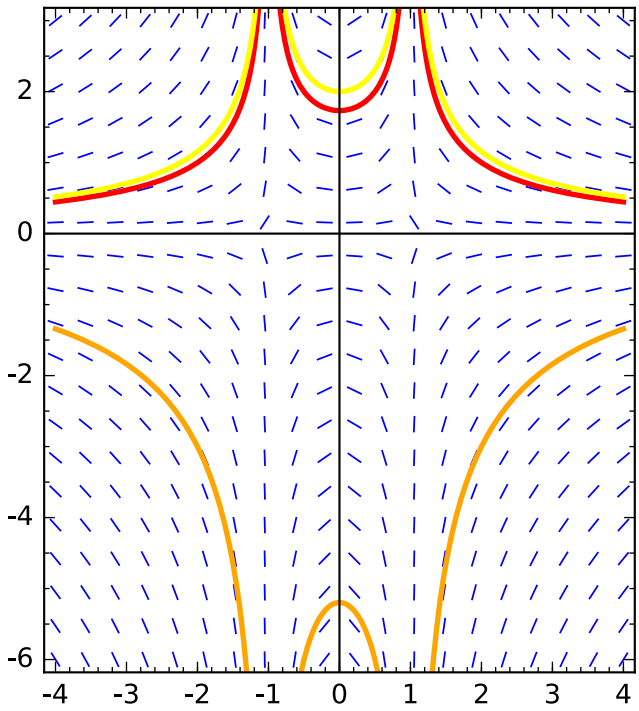

```
# Exercice 1(d)
x = var('x'); y = var('y')
g = plot_slope_field(-y/x, (x,-4,4), (y,-3,3), color='blue')
g += plot(1/(2*x), x, -4, 4, color='red', thickness=2)
g += plot(2/x, x, -4, 4, color='orange', thickness=2)
g.show(aspect_ratio=1,ymin=-3, ymax=3)
```



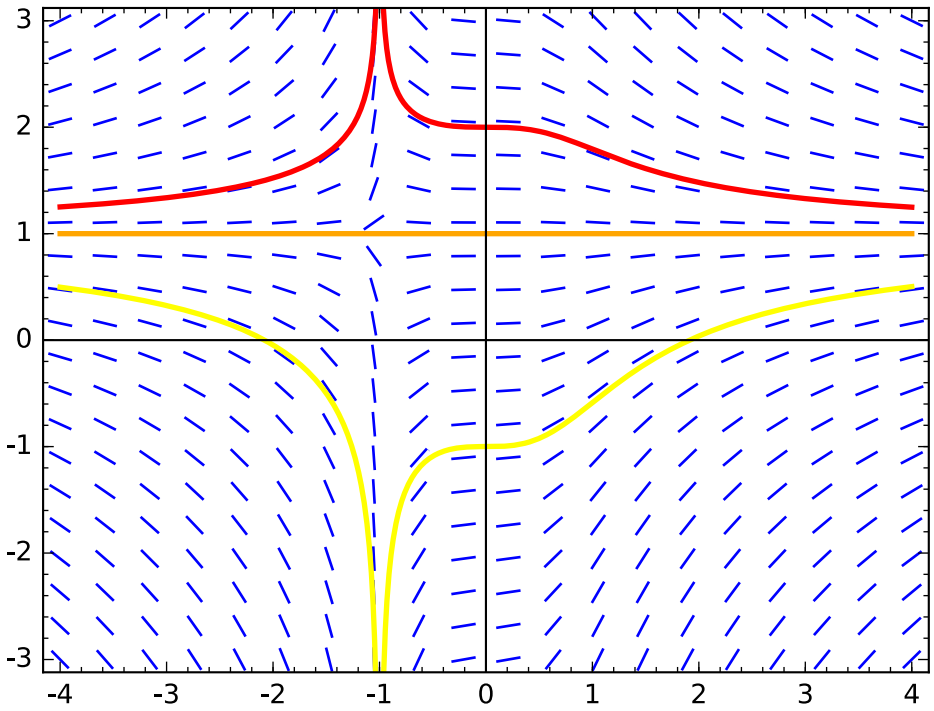

```
# Exercice 2(c)
x = var('x'); y = var('y')
g = plot_slope_field(y/tan(x), (x,-4,4), (y,-3,3), color='blue')
g += plot(1.5*sin(x), x, -4, 4, color='red', thickness=2)
g += plot(-3*sin(x), x, -4, 4, color='orange', thickness=2)
g.show(aspect_ratio=1)
```



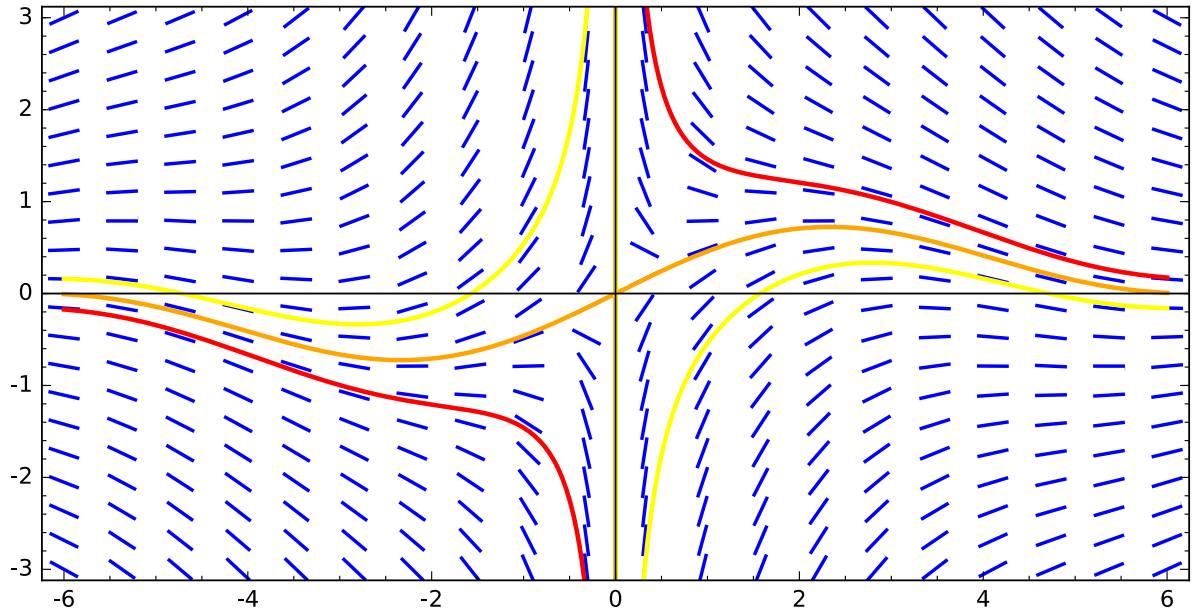

```
# Exercice 3
x = var('x'); y = var('y')
g = plot_slope_field(x*y/(1-x^2), (x,-4,4), (y,-6,3), color='blue')
g += plot(sqrt(3)/sqrt(abs(1-x^2)), x, -4, 4, color='red', thickness\
    =2)
g += plot(-sqrt(3)^3/sqrt(abs(1-x^2)), x, -4, 4, color='orange', \
    thickness=2)
g += plot(2/sqrt(abs(1-x^2)), x, -4, 4, color='yellow', thickness=2)
g.show(aspect_ratio=1,ymin=-6, ymax=3)
```



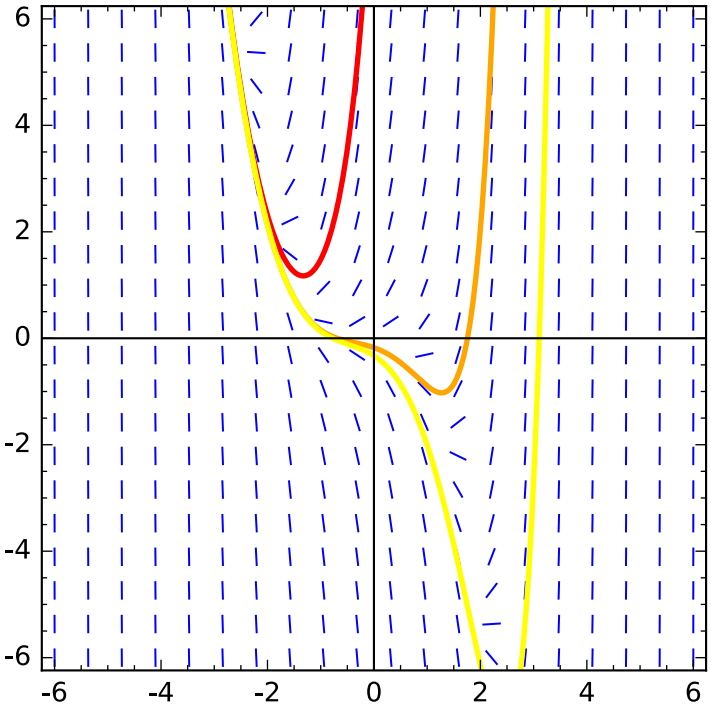

```
# Exercice 4(a)
x = var('x'); y = var('y')
g = plot_slope_field(x^2*(1-y)/(1+x^3), (x,-4,4), (y,-3,3), color='\
    blue')
g += plot(1+1*(abs(1+x^3)^(-1/3)), x, -4, 4, color='red', thickness\
    =2)
g += plot(1, x, -4, 4, color='orange', thickness=2)
g += plot(1-2*(abs(1+x^3)^(-1/3)), x, -4, 4, color='yellow', \
    thickness=2)
g.show(aspect_ratio=1,ymin=-3, ymax=3)
```



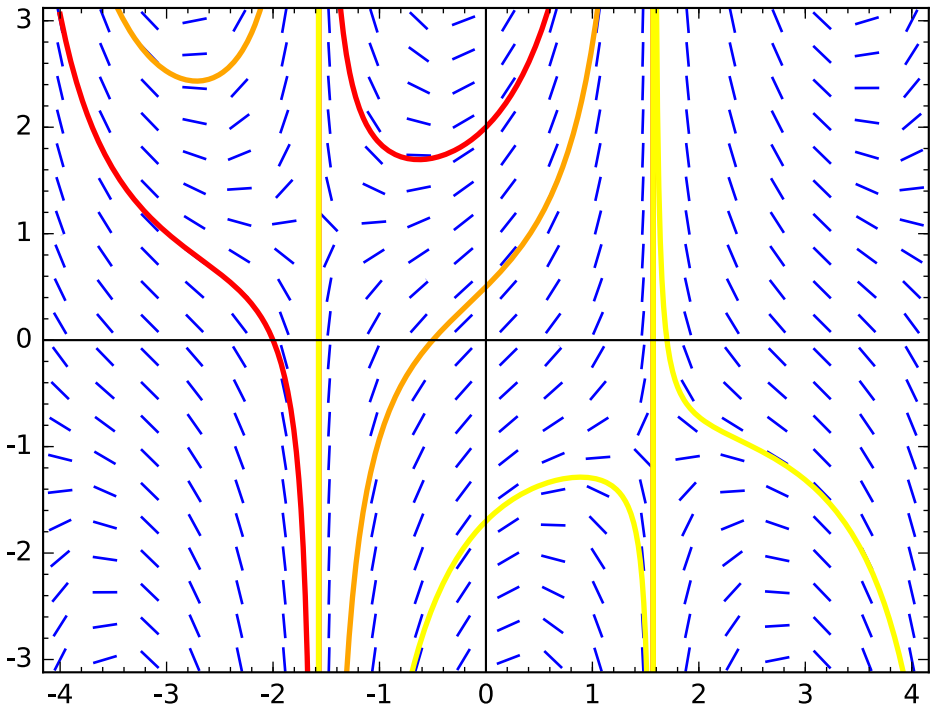

```
# Exercice 4(b)
x = var('x'); y = var('y')
g = plot_slope_field((sin(x)-y)/x, (x,-6,6), (y,-3,3), color='blue')
g += plot((-cos(x)+2)/x, x, -6, 6, color='red', thickness=2)
g += plot((-cos(x)+1)/x, x, -6, 6, color='orange', thickness=2)
g += plot((-cos(x)+0)/x, x, -6, 6, color='yellow', thickness=2)
g.show(aspect_ratio=1,ymin=-3, ymax=3)
```



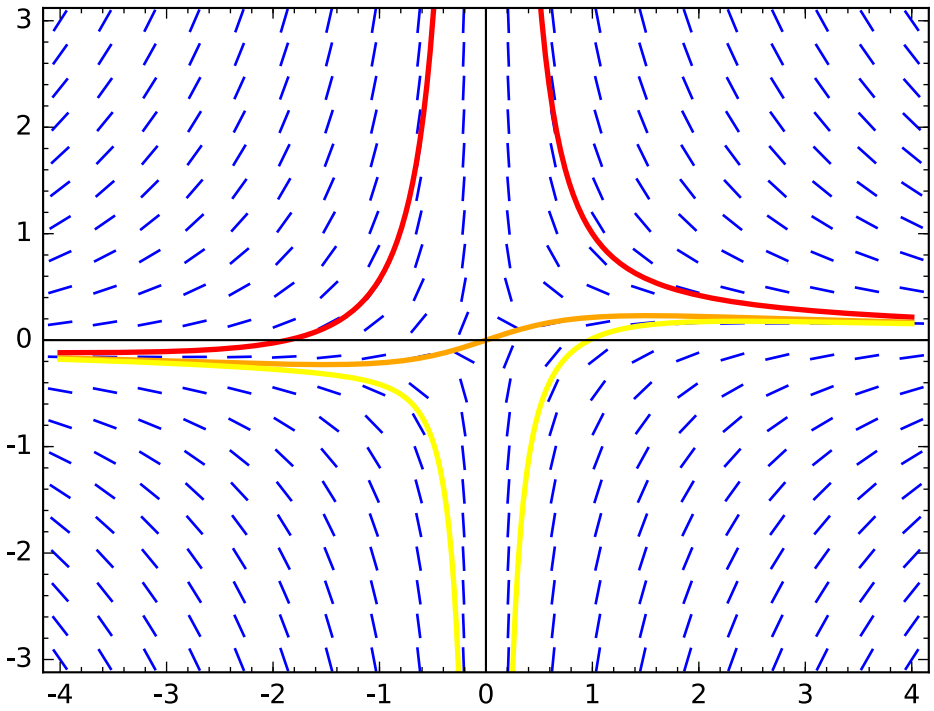
```
# Exercice 4(c)
x = var('x'); y = var('y')
g = plot_slope_field(2*y+x^3, (x,-6,6), (y,-6,6), color='blue')
g += plot(-x^3/2-3*x^2/4-3*x/4-3/8+10*exp(2*x), x, -4, 4, color='red\
    ', thickness=2)
g += plot(-x^3/2-3*x^2/4-3*x/4-3/8+0.2*exp(2*x), x, -4, 6, color='\
    orange', thickness=2)
g += plot(-x^3/2-3*x^2/4-3*x/4-3/8+0.05*exp(2*x), x, -4, 4, color='\
    yellow', thickness=2)
g.show(aspect_ratio=1,ymin=-6, ymax=6)
```



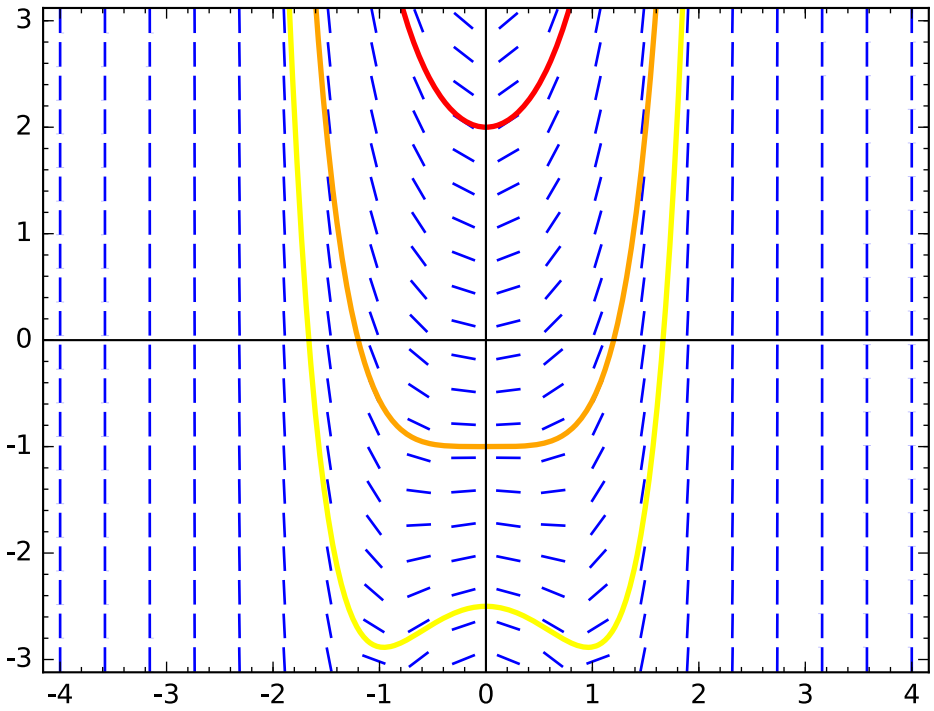

```
# Exercice 4(d)
x = var('x'); y = var('y')
g = plot_slope_field(y*tan(x)+1/cos(x), (x,-4,4), (y,-3,3), color='\
    blue')
g += plot((x+2)/cos(x), x, -4, 4, color='red', thickness=2)
g += plot((x+0.5)/cos(x), x, -4, 4, color='orange', thickness=2)
g += plot((x-1.7)/cos(x), x, -4, 4, color='yellow', thickness=2)
g.show(aspect_ratio=1,ymin=-3, ymax=3)
```




```
# Exercice 5(b)
x = var('x'); y = var('y')
g = plot_slope_field(y*(-2/x)+1/(1+x^2), (x,-4,4), (y,-3,3), color='\
    blue')
g += plot((x-arctan(x)+pi/4)/x^2, x, -4, 4, color='red', thickness\
    =2)
g += plot((x-arctan(x)+0)/x^2, x, -4, 4, color='orange', thickness\
    =2)
g += plot((x-arctan(x)-0.2)/x^2, x, -4, 4, color='yellow', thickness\
    =2)
g.show(aspect_ratio=1,ymin=-3, ymax=3)
```




```
# Exercice 5(c)
x = var('x'); y = var('y')
g = plot_slope_field(y*tanh(x)+x*(cosh(x))^2, (x,-4,4), (y,-3,3), \
    color='blue')
g += plot(cosh(x)*(3+x*sinh(x)-cosh(x)), x, -4, 4, color='red', \
    thickness=2)
g += plot(cosh(x)*(0+x*sinh(x)-cosh(x)), x, -4, 4, color='orange', \
    thickness=2)
g += plot(cosh(x)*(-1.5+x*sinh(x)-cosh(x)), x, -4, 4, color='yellow'\
    , thickness=2)
g.show(aspect_ratio=1,ymin=-3, ymax=3)
```


3
2
1
0
-1
-2
-3
-4
-3
-2
-1
0
1
2
3
4