In [71]:

```
reset()
s,t,v=var('s,t,v')
x=function('x')(t)
print("a)")
x(t)=t^2-2*t
eqp=solve(x(t)==0, t)
show(eqp)
x1 = eqp[0].rhs()
x2 = eqp[1].rhs()
show(diff(x,t)(x1))
print("\t=> x1 este local asimptotic stabil")
show(diff(x,t)(x2))
print("\t=> x2 este instabil")
sf = plot_slope_field(x(t), (v, -5, 5), (t, -3, 3), headaxislength=3, headlength=4, colo
r='red')
show(sf)
print("b)")
x(t)=t*(t-1)*(t-2)
eqp=solve(x(t)==0, t)
show(eqp)
x1 = eqp[0].rhs()
x2 = eqp[1].rhs()
x3 = eqp[2].rhs()
show(diff(x,t)(x1))
print("\t=> x1 este instabil")
show(diff(x,t)(x2))
print("\t=> x2 este local asimptotic stabil")
show(diff(x,t)(x3))
print("\t=> x3 este instabil")
sf = plot_slope_field(x(t), (v, -5, 5), (t, -3, 3), headaxislength=3, headlength=4, colo
r='red')
show(sf)
print("c)")
x(t)=sin(t)
eqp=solve(x(t)==0, t, to_poly_solve='force')
show(eqp)
x1 = pi*(-3)
x2 = pi*(3)
x3 = pi*(-2)
x4 = pi*2
show(diff(x,t)(x1))
print("\t=> x1 este local asimptotic stabil")
show(diff(x,t)(x2))
print("\t=> x2 este local asimptotic stabil")
show(diff(x,t)(x3))
print("\t=> x3 este instabil")
show(diff(x,t)(x4))
print("\t=> x4 este instabil")
sf = plot_slope_field(x(t), (v, -5, 5), (t, -3, 3), headaxislength=3, headlength=4, colo
r='red')
show(sf)
```

a)

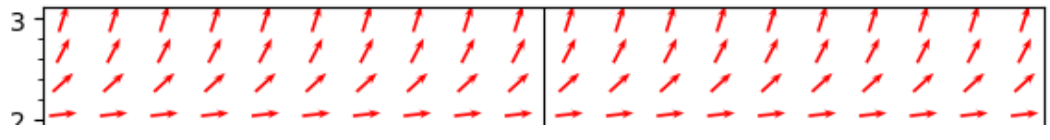
$$[t = 0, t = 2]$$

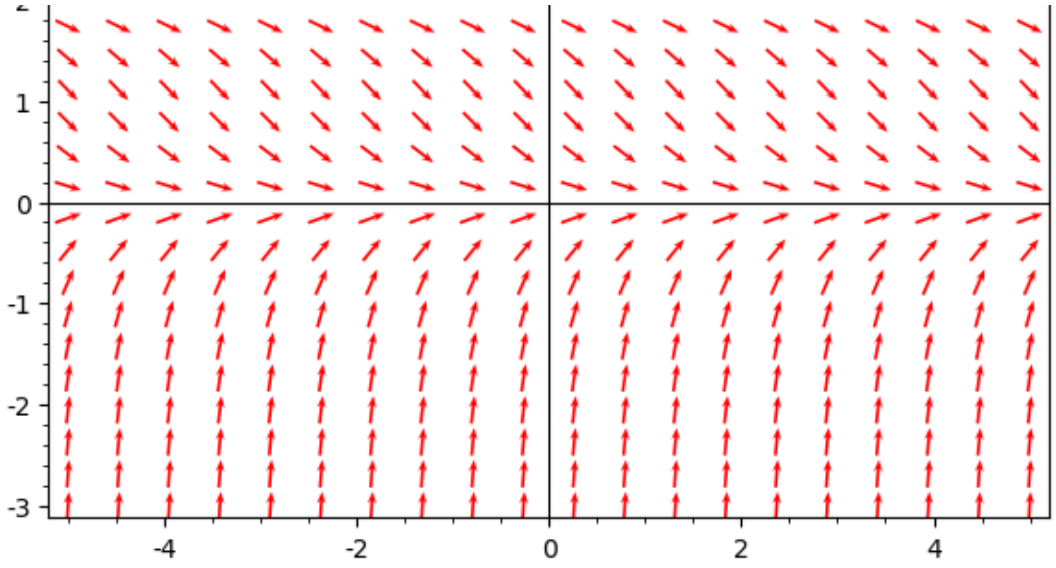
$$-2$$

=> x1 este local asimptotic stabil

$$2$$

=> x2 este instabil





b)

$$[t = 0, t = 1, t = 2]$$

$$2$$

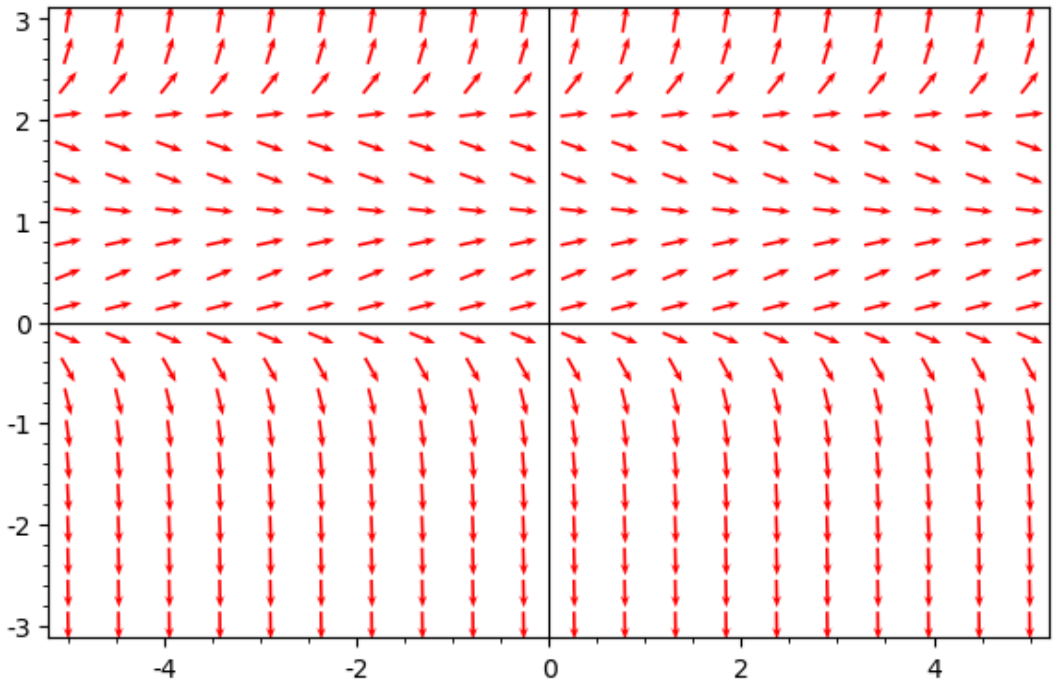
=> x1 este instabil

$$-1$$

=> x2 este local asimptotic stabil

$$2$$

=> x3 este instabil



c)

$$[t = \pi z_{154}]$$

$$-1$$

=> x1 este local asimptotic stabil

$$-1$$

=> x2 este local asimptotic stabil

$$1$$

=> x3 este instabil

1

=> x4 este instabil