>

実習21.2

(1)

> with(DEtools):

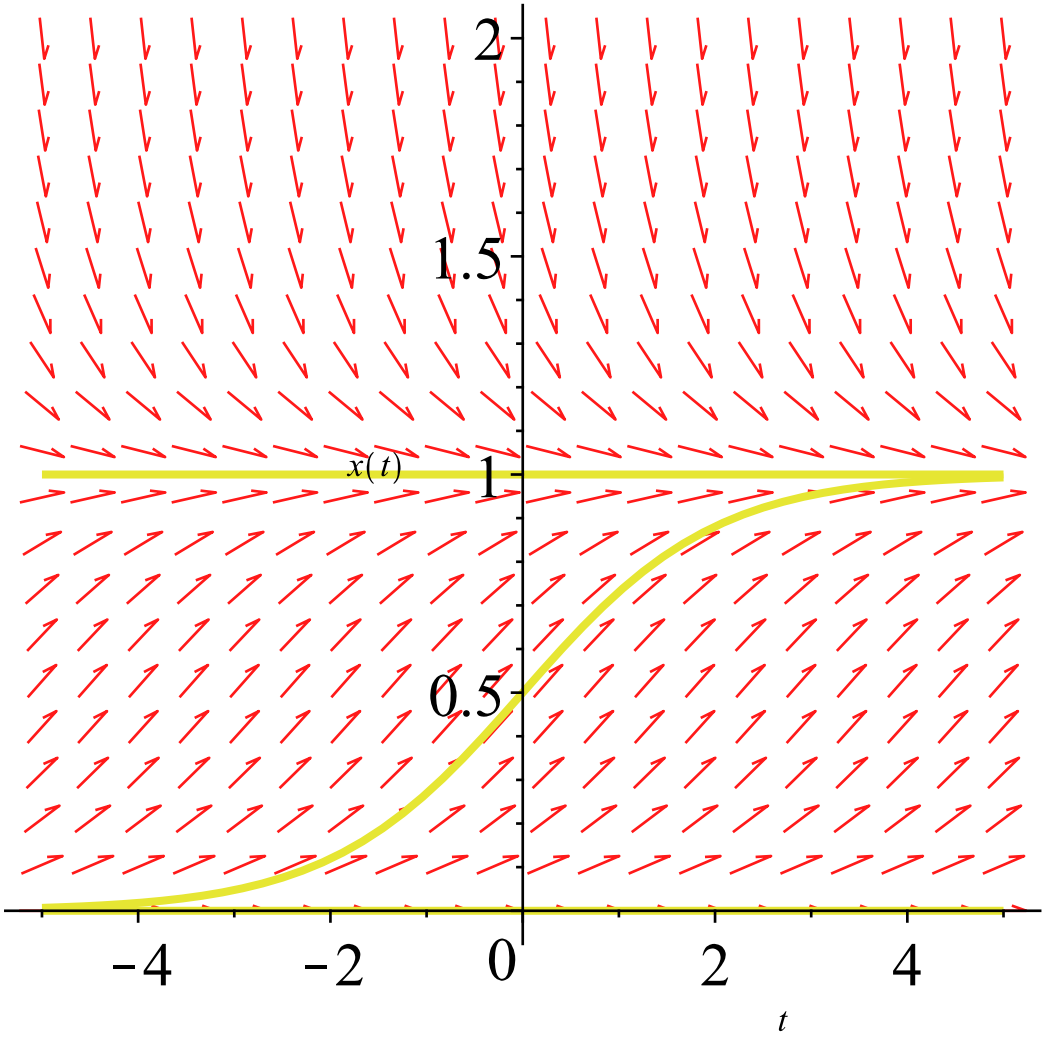
> de1 := diff(x(t), t) = (1 − x(t)) · x(t)

$$de1 := \frac{d}{dt} x(t) = (1 - x(t))\, x(t) \tag{1}$$

> init1 := {[0, 0], [0, 0.5], [0, 1]}

$$init1 := \{[0, 0], [0, 1], [0, 0.5]\} \tag{2}$$

> DEplot(de1, x(t), t = −5..5, x = 0..2, init1)



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(2)

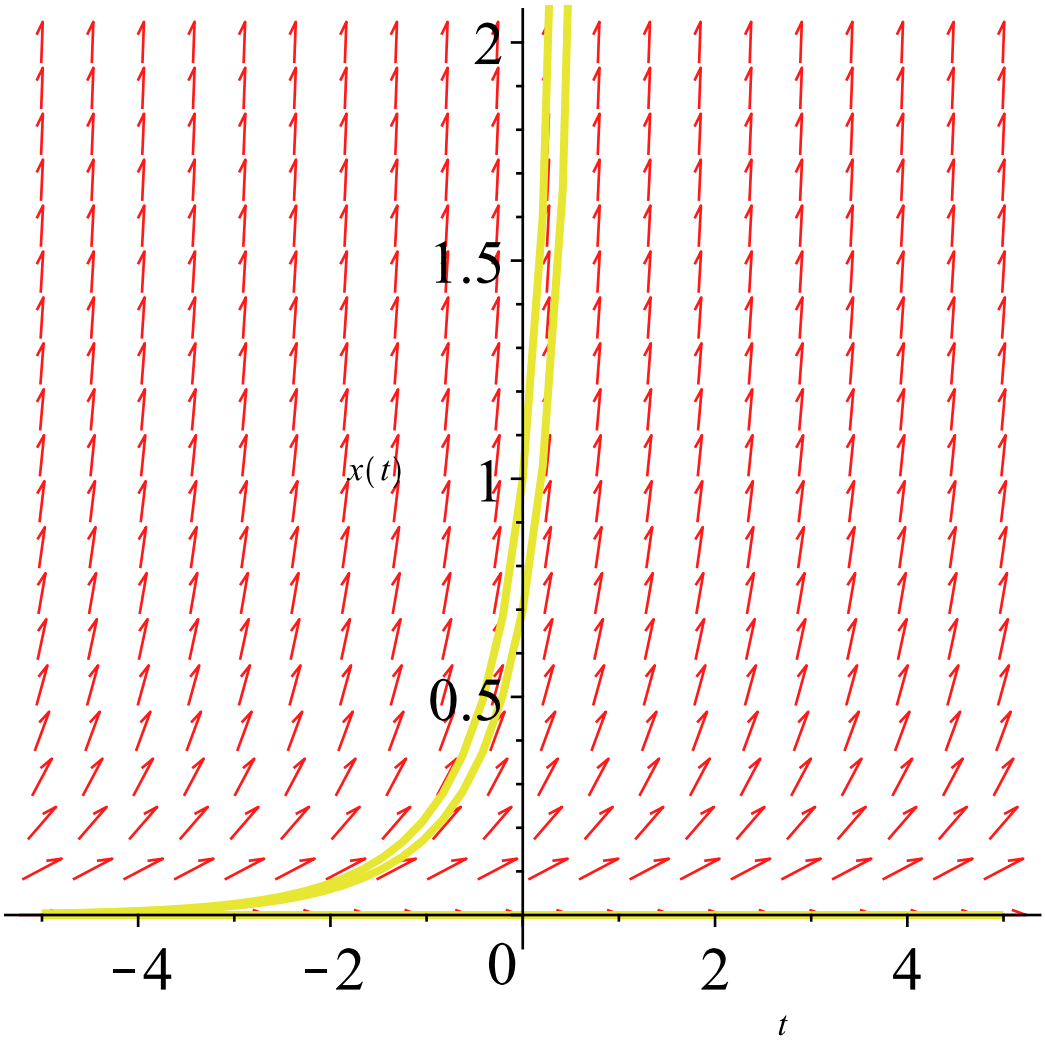
> de2 := diff(x(t), t) = (1 + x(t)) · x(t)

$$de2 := \frac{d}{dt} x(t) = (1 + x(t))\, x(t) \tag{3}$$

> init2 := {[0, 0], [0, 0.7], [0, 1.0]}

$$init2 := \{[0, 0], [0, 0.7], [0, 1.0]\} \tag{4}$$

> DEplot(de2, x(t), t = −5..5, x = 0..2, init2)



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(3)

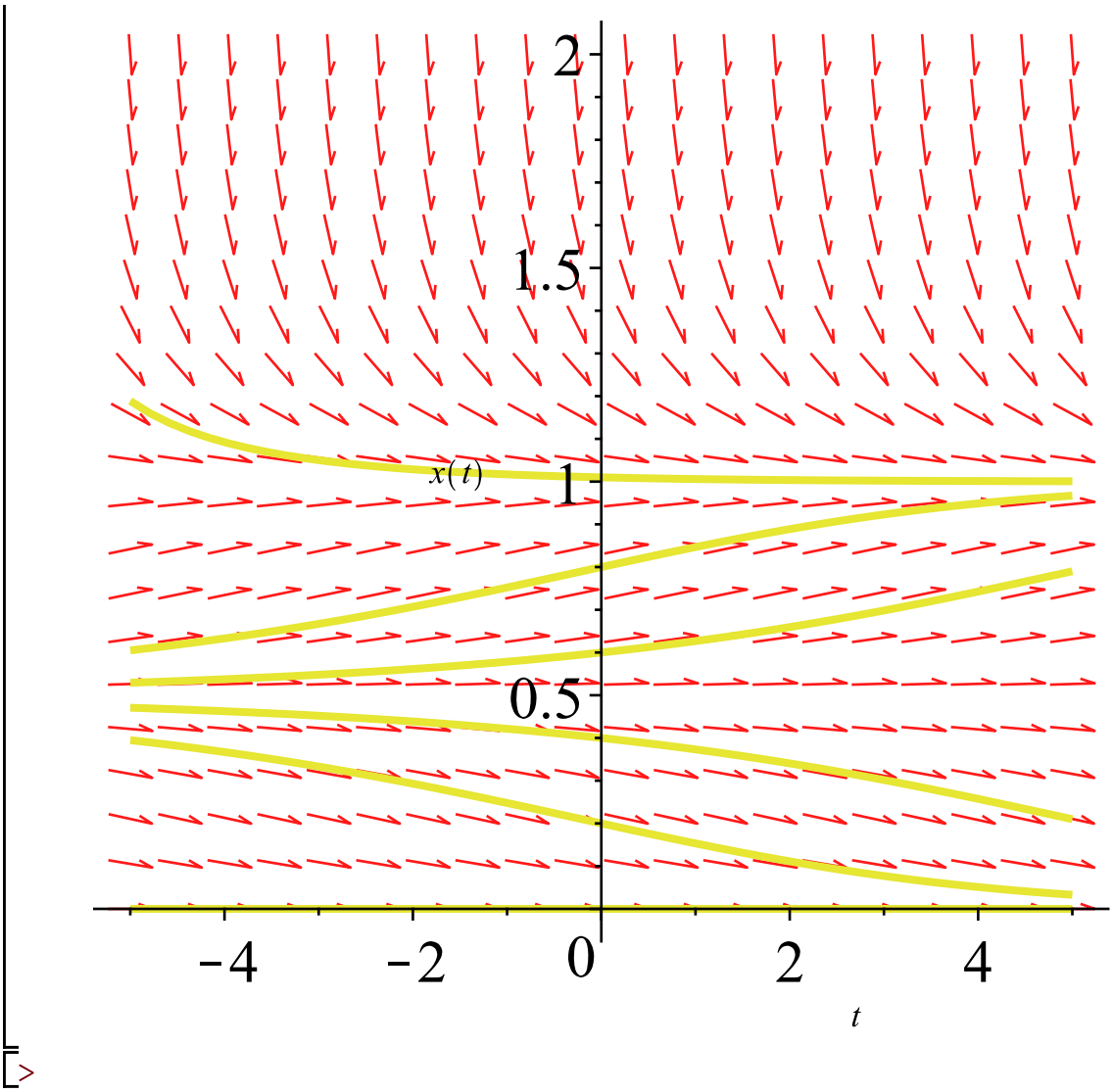
> $de3 := diff(x(t), t) = (1 - x(t)) \cdot (x(t) - 0.5) \cdot x(t)$

$$de3 := \frac{d}{dt} x(t) = (1 - x(t))\ (x(t) - 0.5)\ x(t) \tag{5}$$

> $init3 := \{[0, 0], [0, 0.2], [0, 0.4], [0, 0.6], [0, 0.8], [0, 1.01]\}$

$$init3 := \{[0, 0], [0, 0.2], [0, 0.4], [0, 0.6], [0, 0.8], [0, 1.01]\} \tag{6}$$

> $DEplot(de3, x(t), t = -5..5, x = 0..2, init3)$


2
1.5
1
0.5
x(t)
-4
-2
0
2
4
t