```
> evalf(int(exp(-t^2), t = 0..Pi), 3)
```

$$0.885 \tag{1}$$

```
> with(linalg) : with(LinearAlgebra) : with(Student[LinearAlgebra]) :
> A := Matrix([[1, 7, 3, 3], [-2, 5, 1, 1], [1, 2, -2, 1], [1, -1, 3, 1]])
```

$$A := \begin{bmatrix} 1 & 7 & 3 & 3 \\ -2 & 5 & 1 & 1 \\ 1 & 2 & -2 & 1 \\ 1 & -1 & 3 & 1 \end{bmatrix} \tag{2}$$

```
> eig := Eigenvalues(A)
```

(3)

$$eig := \begin{bmatrix} \cdots \\ \cdots \\ \cdots \\ \cdots \end{bmatrix} \quad \textbf{(3)}$$

> *evalf*(*eig*, 3)

$$\begin{bmatrix} 3.52 + 2.39\,\mathrm{I} \\ 3.52 - 2.39\,\mathrm{I} \\ 0.90 \\ -2.94 \end{bmatrix} \quad (4)$$

> $eq := diff(u(t), t) = u(t)^{-2}$

$$eq := \frac{\mathrm{d}}{\mathrm{d}t} u(t) = \frac{1}{u(t)^2} \quad (5)$$

> $ic := u(0) = 1$

$$ic := u(0) = 1 \quad (6)$$

> $sol := dsolve(\{eq, ic\}, u(t))$

$$sol := u(t) = (3\,t + 1)^{1/3} \quad (7)$$

> $map(limit, rhs(sol), t = \text{infinity})$

$$\infty \quad (8)$$

> $sol1 := dsolve(\{diff(x(t), t) = 1 + x(t)^2 \cdot y(t) - 2.5 \cdot x(t) - x(t), diff(y(t), t) = 2.5 \cdot x(t) - x(t)^2 \cdot y(t), y(0) = 0\}, \{x(t), y(t)\})$

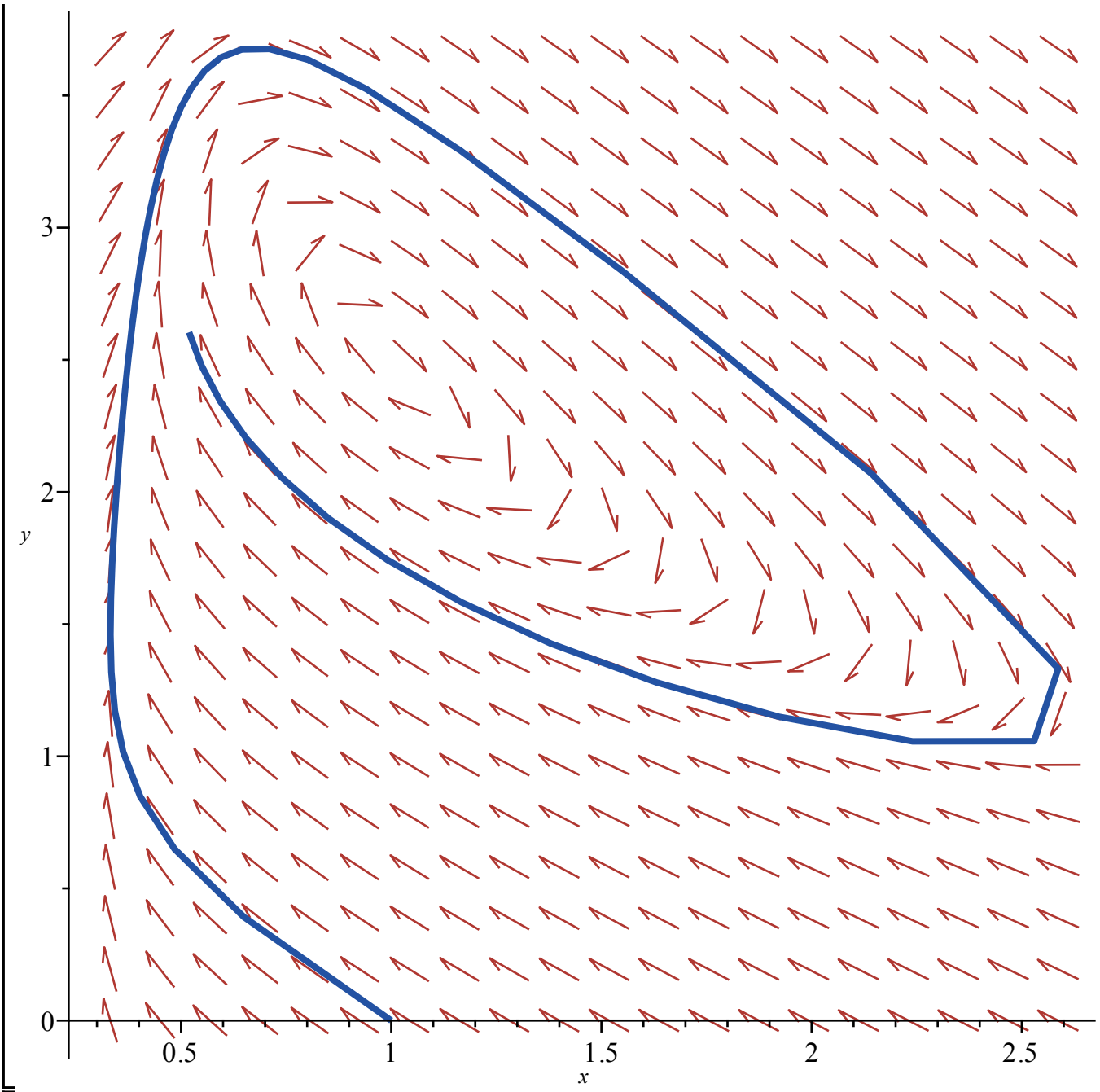
$$sol1 := (\,) \quad (9)$$

> $equilibira := solve(\{1 + x^2 \cdot y - 2.5 \cdot x - x = 0, 2.5 \cdot x - x^2 \cdot y = 0\}, \{x, y\})$

$$equilibira := \{x = 1., y = 2.500000000\} \quad (10)$$

> $with(DEtools)$:

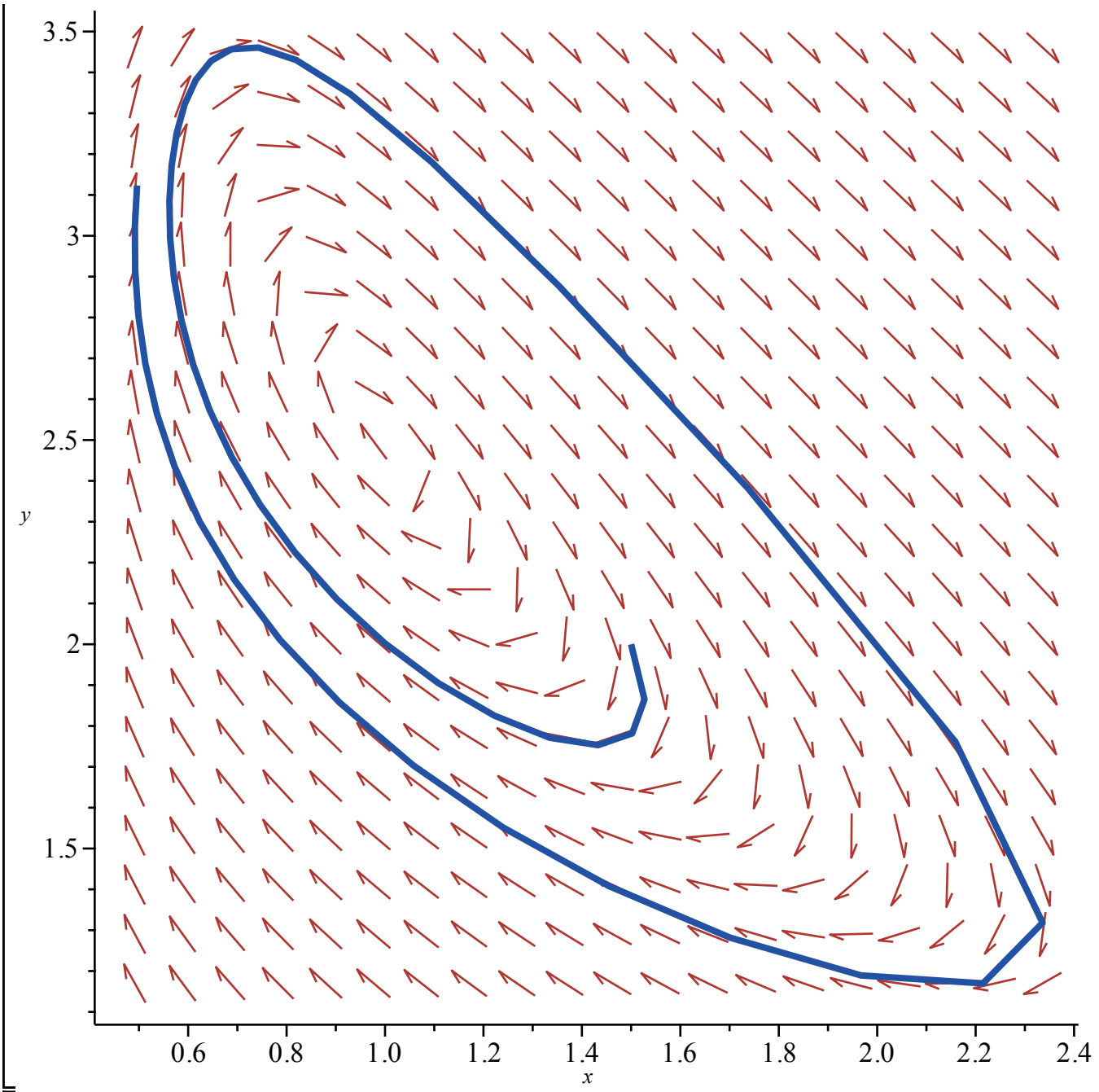
> $phaseportrait([\mathrm{D}(x)(t) = 1 + x(t)^2 \cdot y(t) - 2.5 \cdot x(t) - x(t), \mathrm{D}(y)(t) = 2.5 \cdot x(t) - x(t)^2 \cdot y(t)], [x(t), y(t)], t = 0..10, [[x(0) = 1, y(0) = 0]])$



> $sys := \{D(x)(t) = 1 + x(t)^2 \cdot y(t) - 2.5 \cdot x(t) - x(t), D(y)(t) = 2.5 \cdot x(t) - x(t)^2 \cdot y(t)\}$

$$sys := \{D(x)(t) = 1 + x(t)^2\, y(t) - 3.5\, x(t), D(y)(t) = 2.5\, x(t) - x(t)^2\, y(t)\} \quad \textbf{(11)}$$

> $phaseportrait([D(x)(t) = 1 + x(t)^2 \cdot y(t) - 2.5 \cdot x(t) - x(t), D(y)(t) = 2.5 \cdot x(t) - x(t)^2 \cdot y(t)], [x(t), y(t)], t = 0..10, [[x(0) = 1.5, y(0) = 2]])$



> $ic1 := \{x(0) = 0, y(0) = 0\}$

$$ic1 := \{x(0) = 0, y(0) = 0\} \quad \textbf{(12)}$$

> $dsolve(\{sys \textbf{ union } ic1\}, \{x(t), y(t)\})$

```
Error, (in dsolve) invalid input: PDEtools/sdsolve expects its 1st
argument, SYS, to be of type Or(set({`<>`, `=`, algebraic}),list({`<>`,
`=`, algebraic}),`casesplit/ans`(list,list)), but received {{x(0) = 0,
y(0) = 0, D(x)(t) = 1+x(t)^2*y(t)-7/2*x(t), D(y)(t) = 5/2*x(t)-x(t)^2*y
(t)}}
```

> *restart* :

> $de1 := diff(x(t), t) = 1 + x(t)^2 \cdot y(t) - 2.5 \cdot x(t) - x(t)$

$$de1 := \frac{d}{dt} x(t) = 1 + x(t)^2 y(t) - 3.5\, x(t) \quad \textbf{(13)}$$

```
> de2 := diff(y(t), t) = 2.5·x(t) − x(t)^2·y(t)
```

$$de2 := \frac{d}{dt} y(t) = 2.5\, x(t) - x(t)^2\, y(t) \tag{14}$$

```
> ic1 := x(0) = 1
```

$$ic1 := x(0) = 1 \tag{15}$$

```
> ic2 := y(0) = 0
```

$$ic2 := y(0) = 0 \tag{16}$$

```
> sol := dsolve({de1, de2, ic1, ic2}, {x(t), y(t)}, numeric)
```

$$sol := \mathbf{proc}(x\_rkf45)\ \ldots\ \mathbf{end\ proc} \tag{17}$$

```
> with(plots) : odeplot(sol, [x(t), y(t)], t = 0..20)
```