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> restart;
> with(DEtools):
> de1 := diff(y(t),t) = y(t)*(y(t)-a)*(b-y(t));

$$de1 := \frac{\partial}{\partial t} y(t) = y(t) (y(t) - a) (b - y(t))$$

> a := 1; b := 2;

$$a := 1$$


$$b := 2$$

> const := [solve(y(t)*(y(t)-a)*(b-y(t))=0, y(t))];

$$const := [0, 1, 2]$$

> y2 := const(2);

$$y2 := [0, 1, 2]$$

> simplify(subs(y(t)=y2,de1));

$$\frac{\partial}{\partial t} [0, 1, 2] = [0, 1, 2] ([0, 1, 2] - 1) (2 + [0, -1, -2])$$

> ic := y(0) = (a+b)/2;

$$ic := y(0) = \frac{3}{2}$$

> partsol := simplify(dsolve({de1,ic},y(t)));

$$partsol := y(t) = \frac{I e^t \sqrt{3} + \sqrt{-9 - 3 e^{(2t)}}}{\sqrt{-9 - 3 e^{(2t)}}}$$

> subs(partsol,ic);

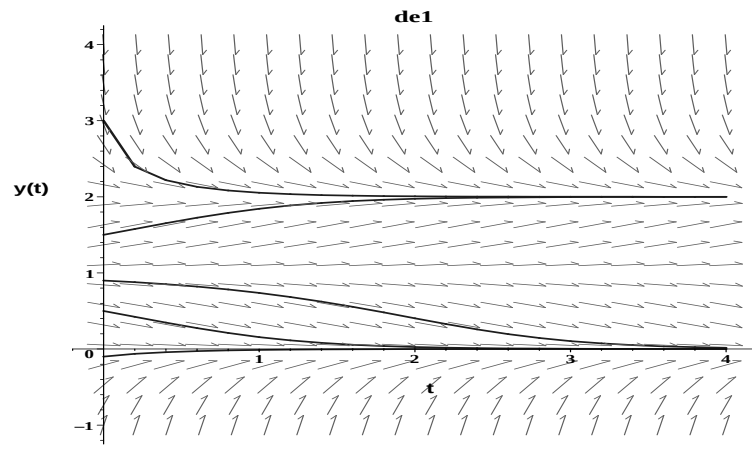
$$y(0) = \frac{3}{2}$$

> simplify(subs(partsol,de1));

$$\frac{-I e^t \sqrt{3} \sqrt{-9 - 3 e^{(2t)}}}{(3 + e^{(2t)})^2} = \frac{-3 I e^t}{\sqrt{-(3 + e^{(2t)})^3}}$$

> DEplot(de1,y(t),t=0..4,{[0,3],[0,1.5],[0,.5],[0,.9],[0,-.1]},
> title='de1', axesfont=[TIMES,BOLD,10],titlefont=[TIMES,BOLD,14],
> labelfont=[HELVETICA,BOLD,12], arrows=THIN,linecolor=blue,y=-1..4);

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Legend

_____	Curve 1
—————	Curve 2