

Math 2280-1

Friday 1/14 6:13-1.4

Monday is MLK day.
Thurs: more applications
of separable DE's.

①

- pages 4-5 Wed

separable DE example
with singular solutions
&

$\exists!$ then for IVP.

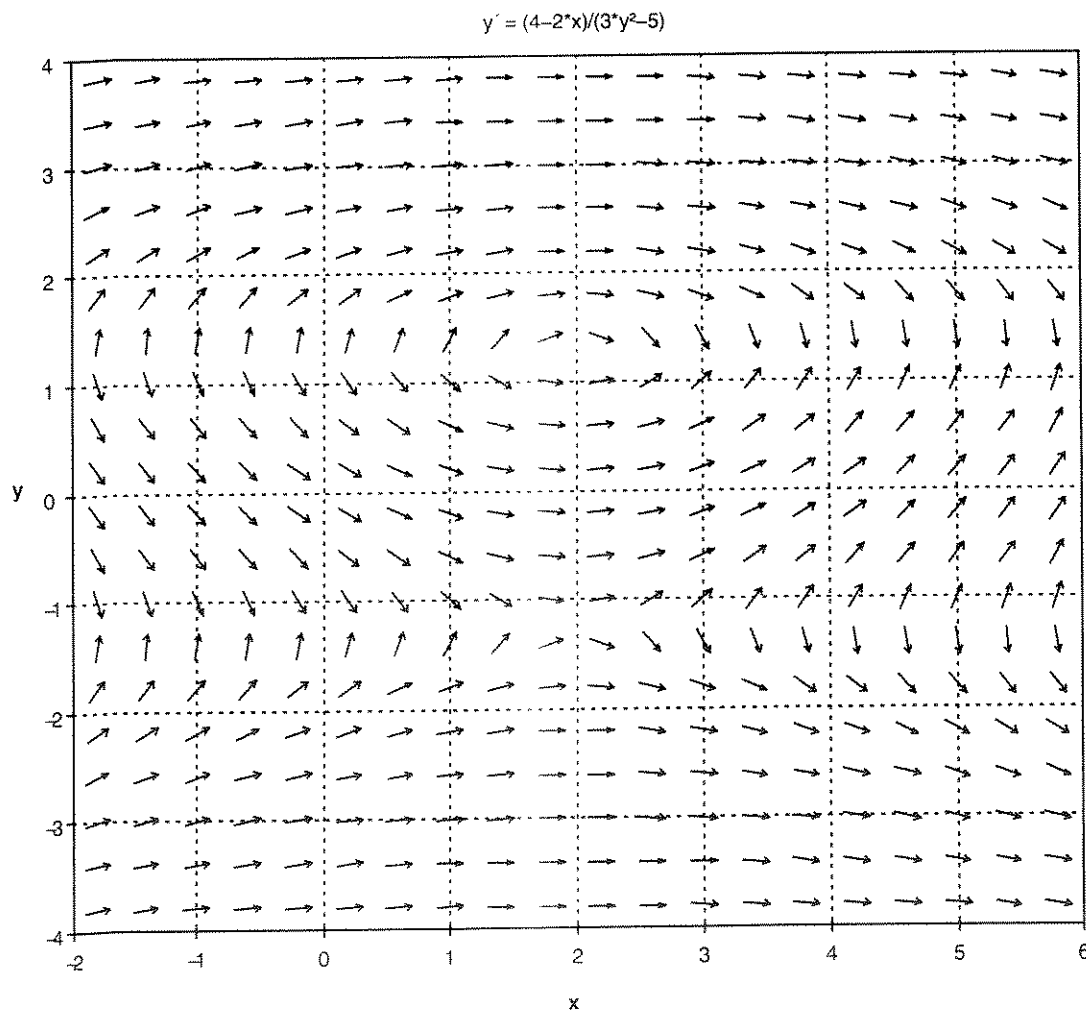
then, more examples to illustrate the
existence-uniqueness theorem.

exercise 1:

1a) Solve $\frac{dy}{dx} = \frac{4-2x}{3y^2-5}$

1b) for what IVP's (what (x_0, y_0))
do conditions for $\exists!$ theorem
fail for this DE.

1c) explain (4b) in terms of slope
field & 1a)



Exercise 2 Consider the DE

2

$$\frac{dy}{dx} = 6x(y-1)^{2/3}$$

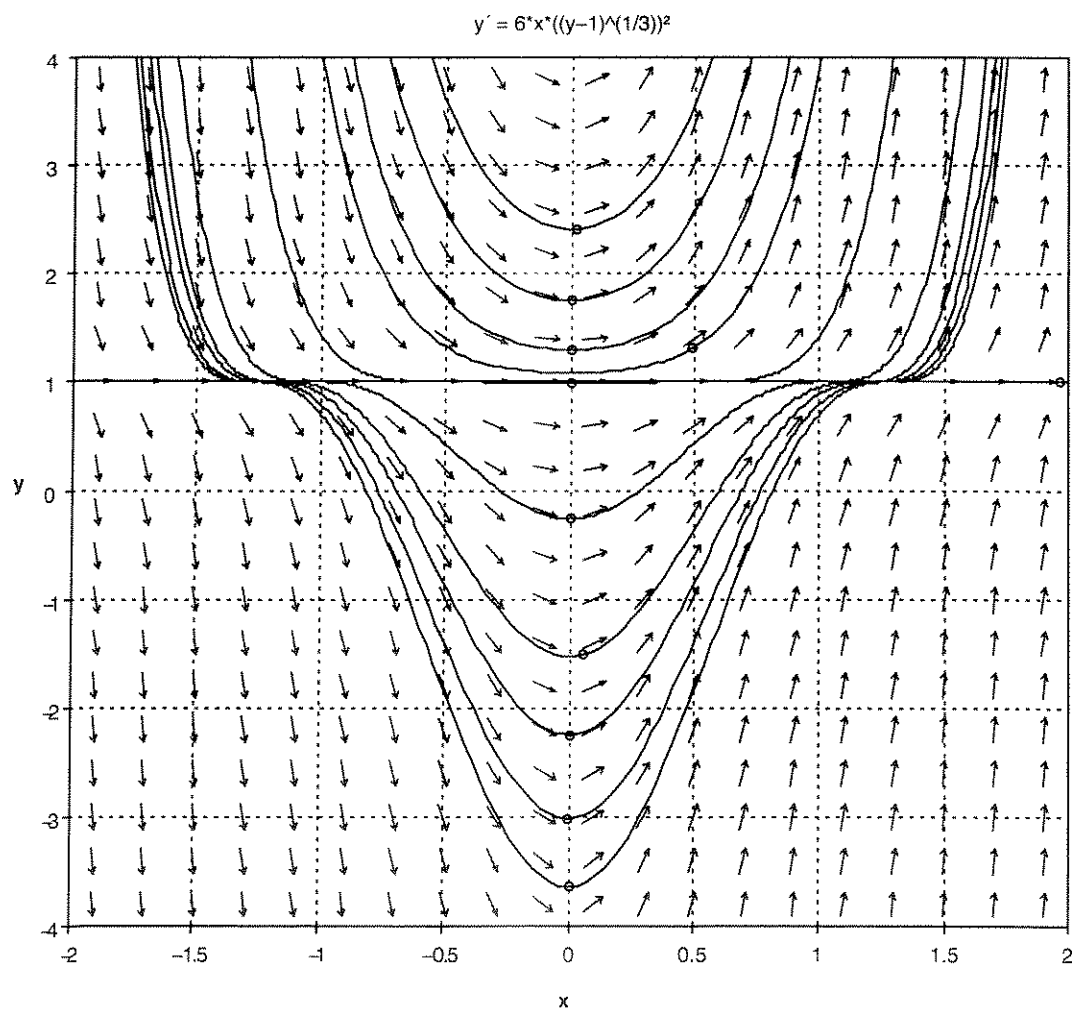
2a) solve by sep. vars. Keep track of assumptions

2b) find all singular solutions

2c) relate 2a) b) to the local existence-uniqueness theorem

2d) does every IVP have a solution that exists for all x ? ("global" existence)

2e) which global solns are unique?



Homework for Fri. 1/21

1.3 3, (6), (11, 12, 13, 18, 21, 23, 29).

In (6) use dfield to draw the slope field.

Then

(6b) Verify $y(x) = x + Ce^{-x}$ solves this DE.

(6c) Use dfield to sketch several solution trajectories onto the slope field and explain why these curves are consistent with (6b).

Also, (29) = (29a)

(29b) Use dfield to illustrate several of the non-unique solutions that you verify exist in (29a).

1.4 (9, 12, 19, 22), (35, 41, 43, 46, 54, 66)

1.5 1, (7, 13, 34), 36, (38, 41)