

## 2 Attracting and repelling fixed points

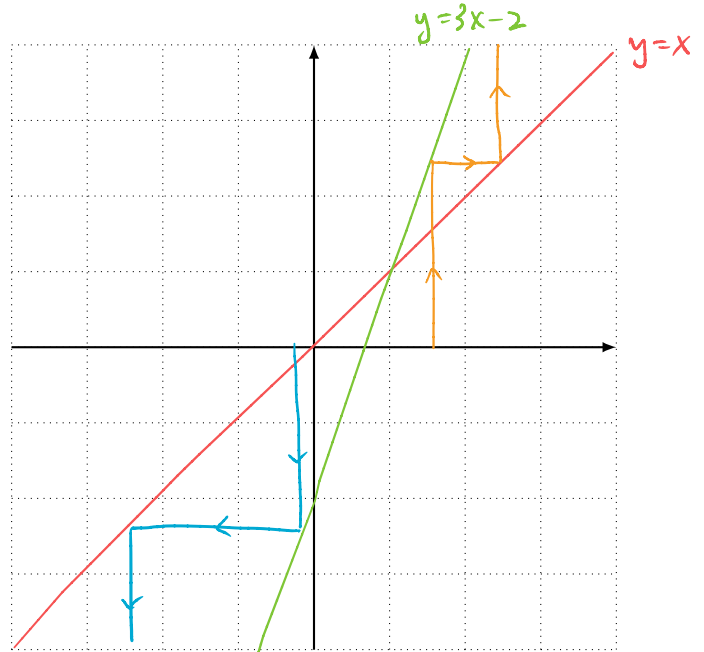
- A fixed point  $c$  is **attracting** if whenever  $A_0$  is sufficiently close to  $c$ , then  $A_n \rightarrow c$  as  $n \rightarrow \infty$
- A fixed point  $c$  is **repelling** if no matter how close  $A_0$  is to  $c$ , then  $A_n$  is eventually far away from  $c$  infinitely many times
- A DS may have a fixed point that is neither attracting nor repelling

**Example 4.** Consider the DS  $A_{n+1} = 3A_n - 2$ . Find the fixed points. Use cobwebs to determine whether each fixed point is attracting, repelling, or neither.

Here,  $f(c) = 3c - 2$

FP:  $c = 3c - 2$   
 $2c = 2$   
 $c = 1$

$c = 1$  is a repelling FP.



**Example 5.** Consider the DS  $A_{n+1} = -A_n + 1$ . Find the fixed points. Use cobwebs to determine whether each fixed point is attracting, repelling, or neither.

Blank space for handwritten work.

