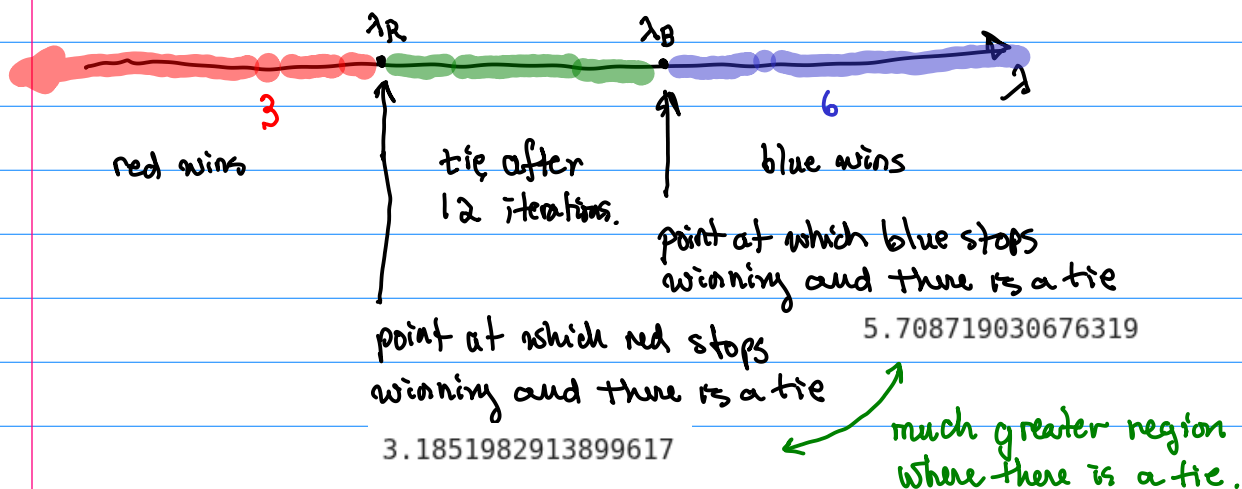
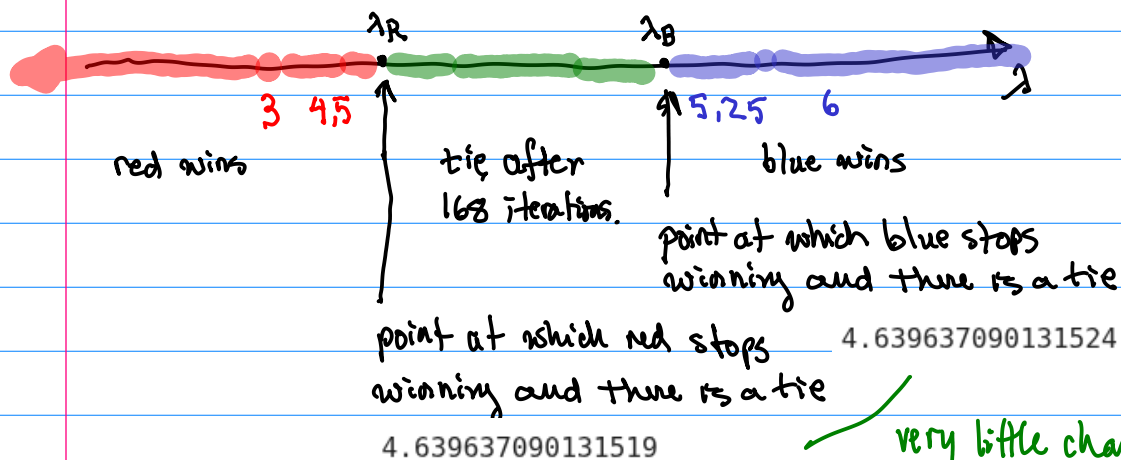


Goal to find how big the green area is



Linear resistance ...

$$V_R = i_R R$$

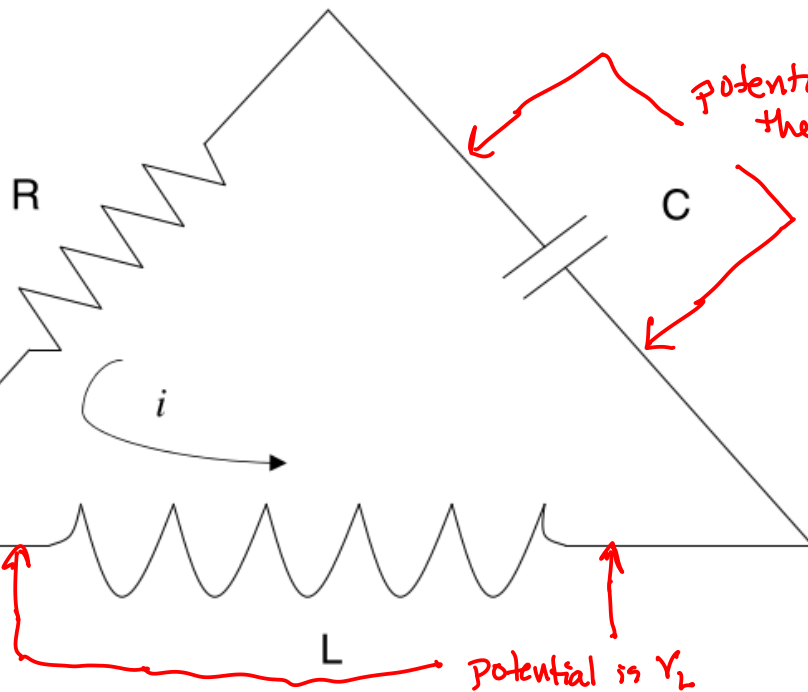
Nonlinear relation

$$V_R = f(i_R)$$

$$V_R = i_R^3 + 4i_R$$

$$= i_R (i_R^2 + 4)$$

like an R
that depends
on i_R



potential across
the capacitor
is V_C

potential is V_L

current is the same through each component since they are connected in a loop...

$$i_C = i_L = i$$

$$V_C + V_R + V_L = 0$$

all potentials add up to zero because we've got all elements and the system is closed.

$$C \frac{dV_C}{dt} = i_C$$

$$L \frac{di_L}{dt} = V_L = -V_C - V_R = -V_C - f(i_3) = -V_C - i^3 - 4i$$

$$C \frac{dV_C}{dt} = i$$

$$L \frac{di}{dt} = -V_C - i^3 - 4i$$

Two equations in two unknowns: V_C and i .
 x_2 x_1

Quiz 7 due on Friday