The current through each component can be described by each of the following:[[1]](#footnote-1)

(1)

(2)

(3)

For our circuit, Kirchhoff’s Laws give the following equations:

(4) (5)

(6)

Plug (1), (2), and (3) into (5).

(7)

Take the derivative of both sides to get rid of the integral.

(8)

Multiply by L.

(9)

Substitute VL from (9) into (6).

(10)

Solve (10) for and to give equations for the slope function.

(11) (12)

1. Retrieved from [http://uhaweb.hartford.edu/ltownsend/Series\_and\_Parallel\_Equations\_from\_a\_DE\_perspective.pdf on October 29](http://uhaweb.hartford.edu/ltownsend/Series_and_Parallel_Equations_from_a_DE_perspective.pdf%20on%20October%2029), 2018 [↑](#footnote-ref-1)