Math 3B: Lecture 22

Noah White

November 14, 2016

Announcements

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- Lectures 11/28 and 11/30 change.

Harassment

OBTAINING REDRESS OR COUNSELING AT UCLA WHEN SUBJECTED TO HARASSMENT OR DISCRIMINATION

In the aftermath of the presidential election, in which passions ran high surrounding issues of tolerance for diversity, it is important to remember that harassment and discrimination based on such things as:

- race, ethnicity, ancestry, color

are not acceptable at UCLA, and may have serious consequences. Information for how to obtain redress or counseling if you are subjected to such harassment or discrimination can be found at: `https://equity.ucla.edu/report-an-incident/`

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- religion

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Last time

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- Von Bertalanffy growth model

Von Bertalanffy growth model

Ludwig von Bertalanffy estimated the growth of an organism by assuming that it

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for positive a and b.

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- Surface area is $S = 6L^2$

Von Bertalanffy growth model

- We can differentiate the relationship $M = L^3$

$$\frac{\mathrm{d}M}{\mathrm{d}t} = 3L^2 \frac{\mathrm{d}L}{\mathrm{d}t}$$

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- We get

$$3L^2\frac{\mathrm{d}L}{\mathrm{d}t} = 6aL^2 - bL^3$$

Von Bertalanffy growth model

- Dividing by $3L^2$ gives

$$\frac{\mathrm{d}L}{\mathrm{d}t} = 2a - \frac{b}{3}L = \frac{b}{3}\left(\frac{6a}{b} - L\right)$$

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Von Bertalanffy growth model

The growth of an organism is goverened by

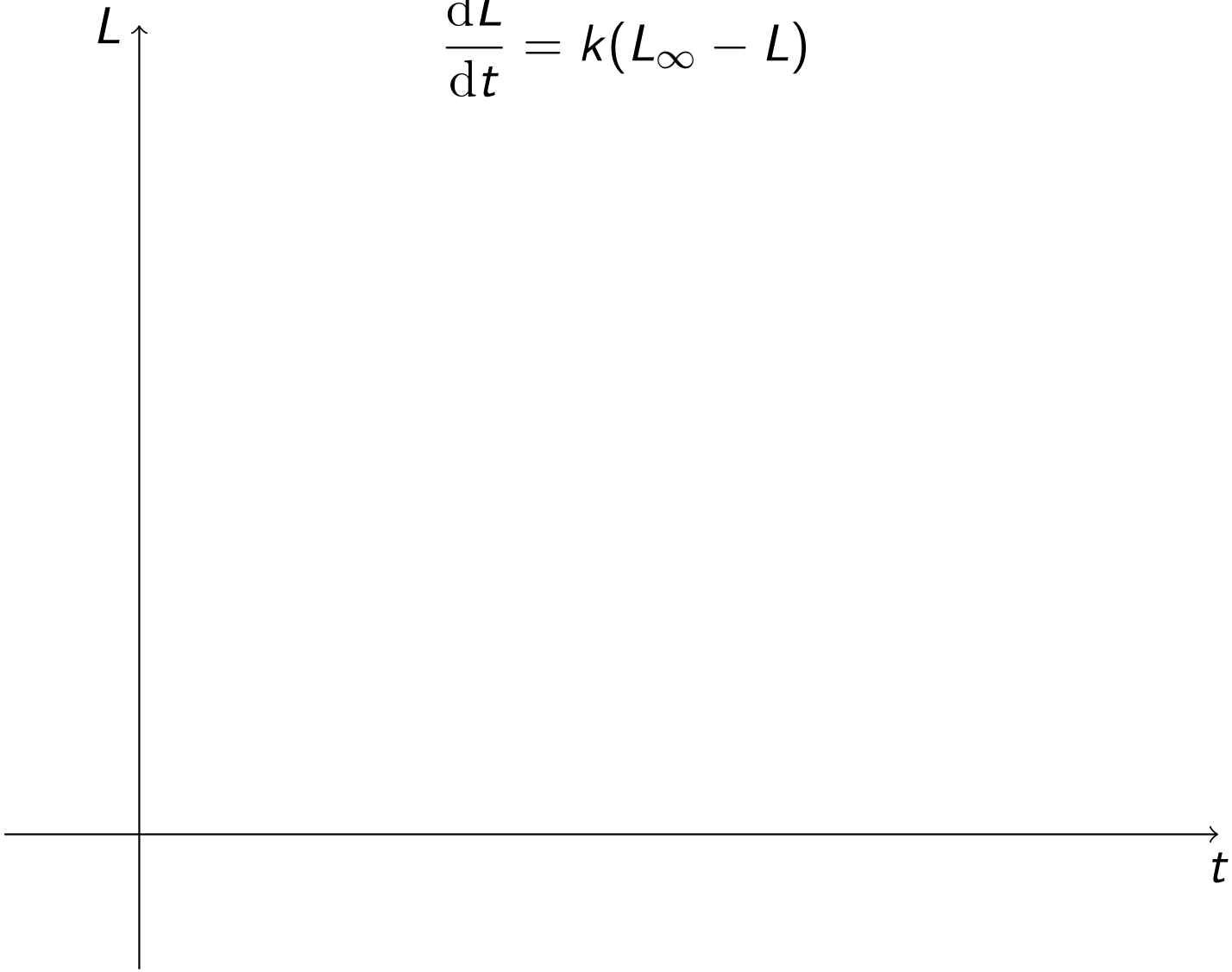
$$\frac{\mathrm{d}L}{\mathrm{d}t} = k(L_\infty - L)$$

where k and L_∞ are positive constants.

Qualitative understanding

When an organism begins its life, it should have lengths close to zero, i.e. $L(0) = 0$.

$$\frac{\mathrm{d}L}{\mathrm{d}t} = k(L_\infty - L)$$



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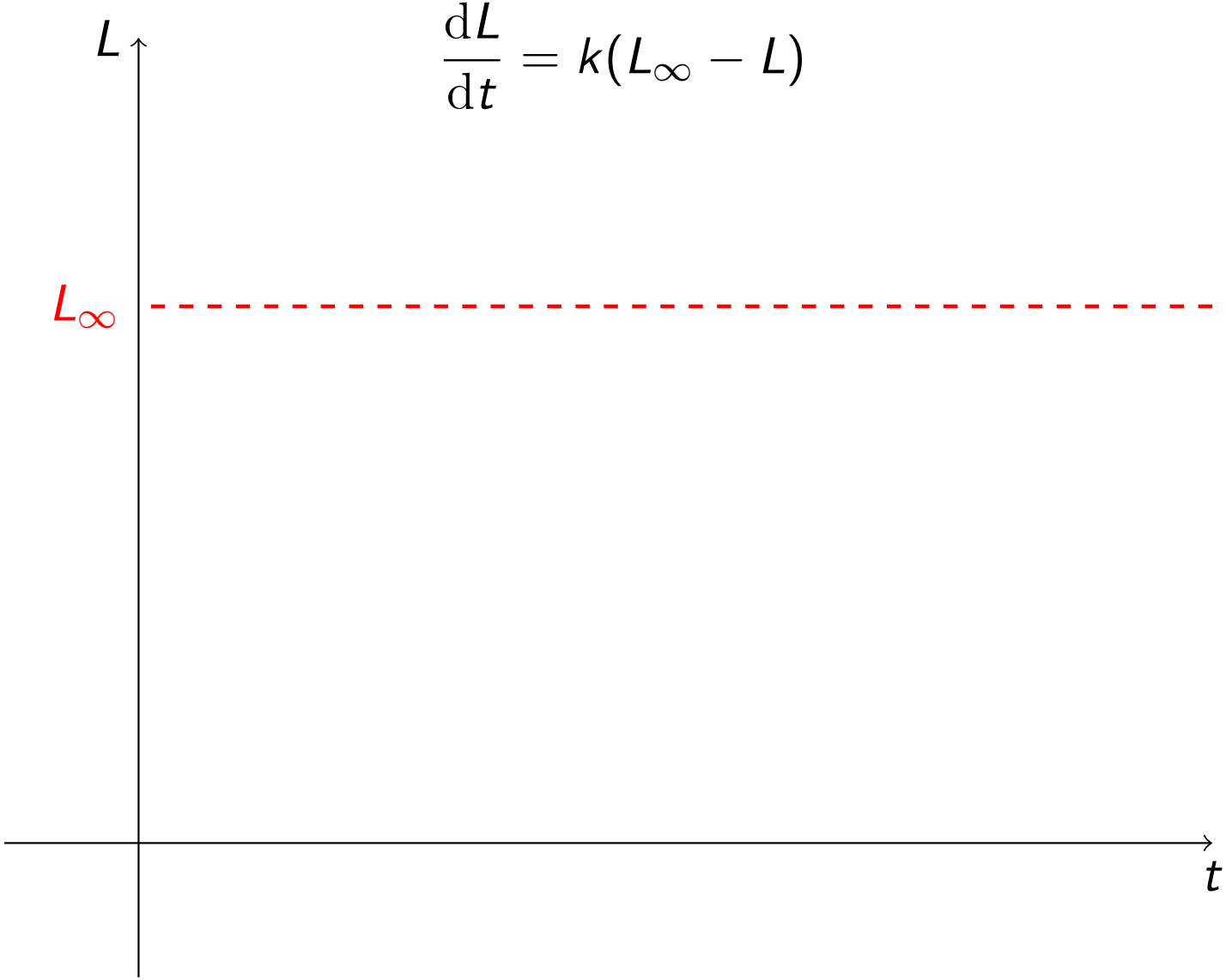

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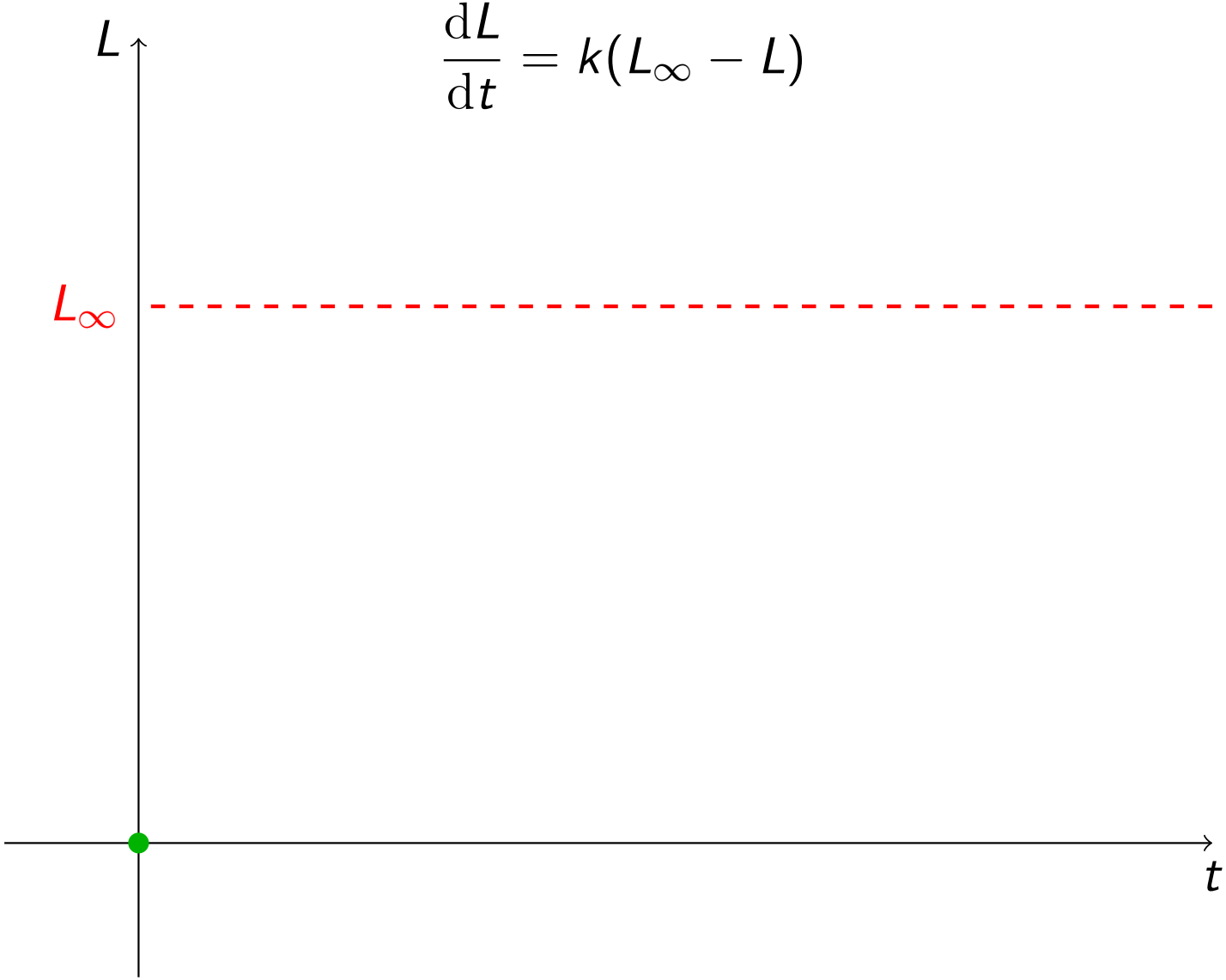

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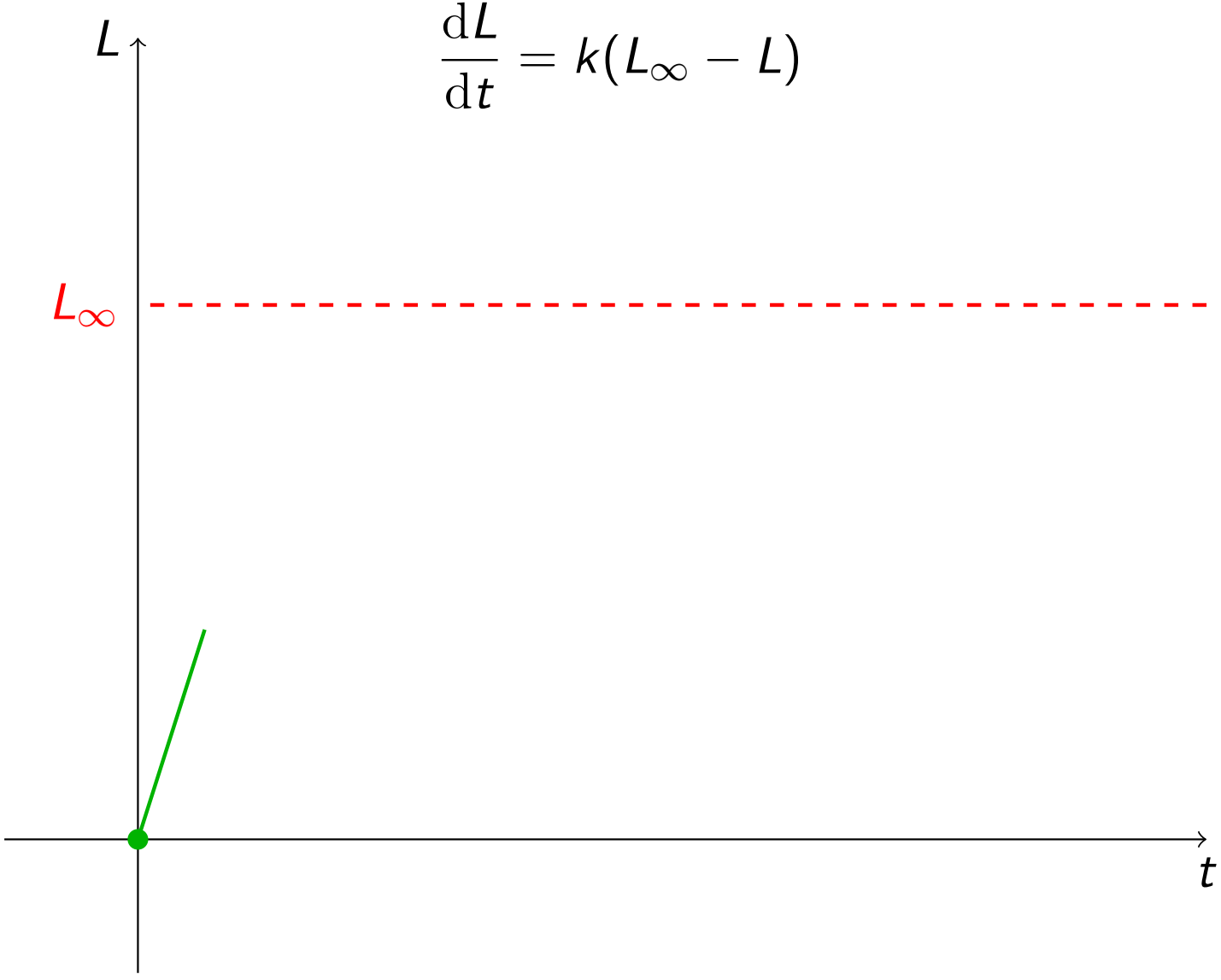

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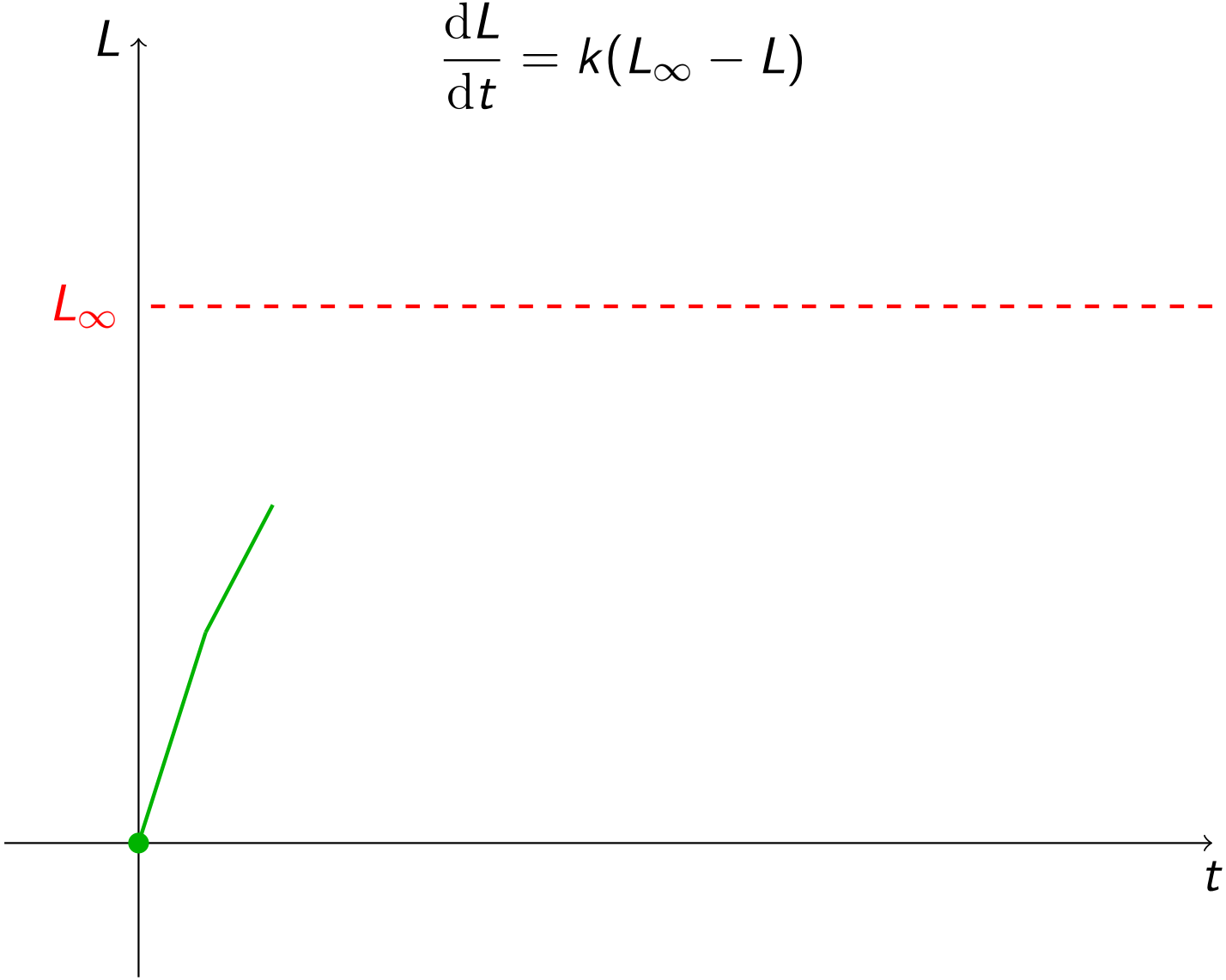

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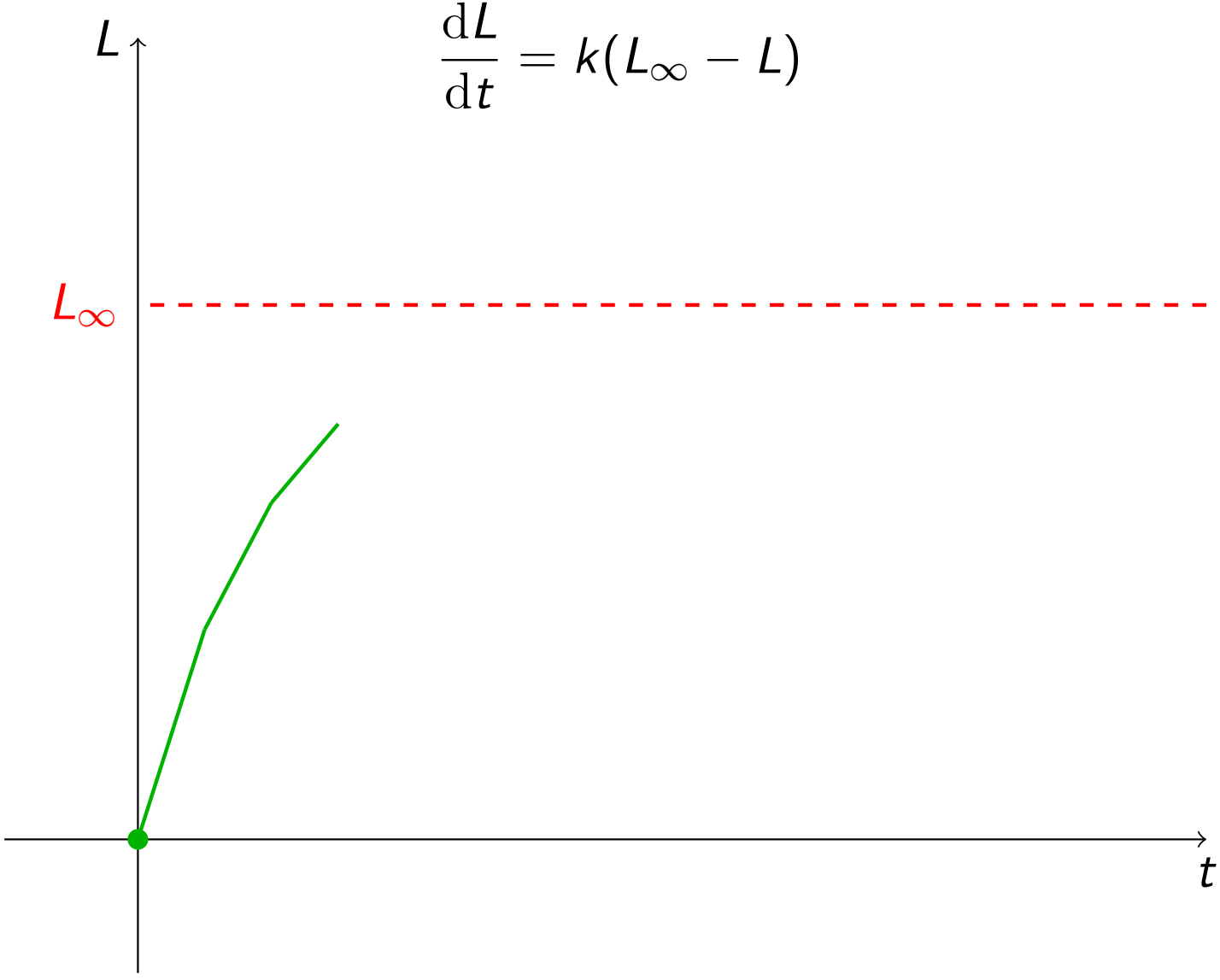

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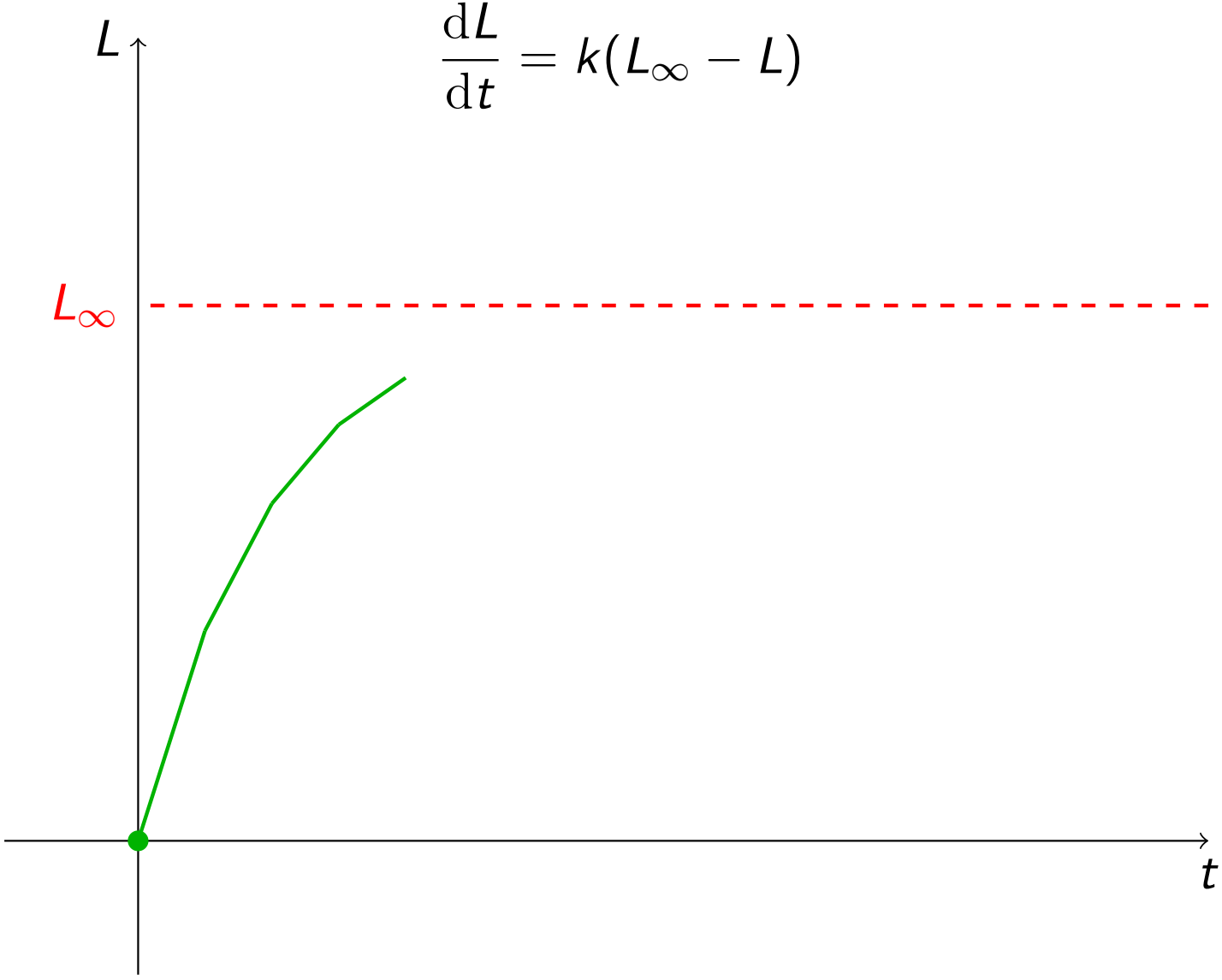

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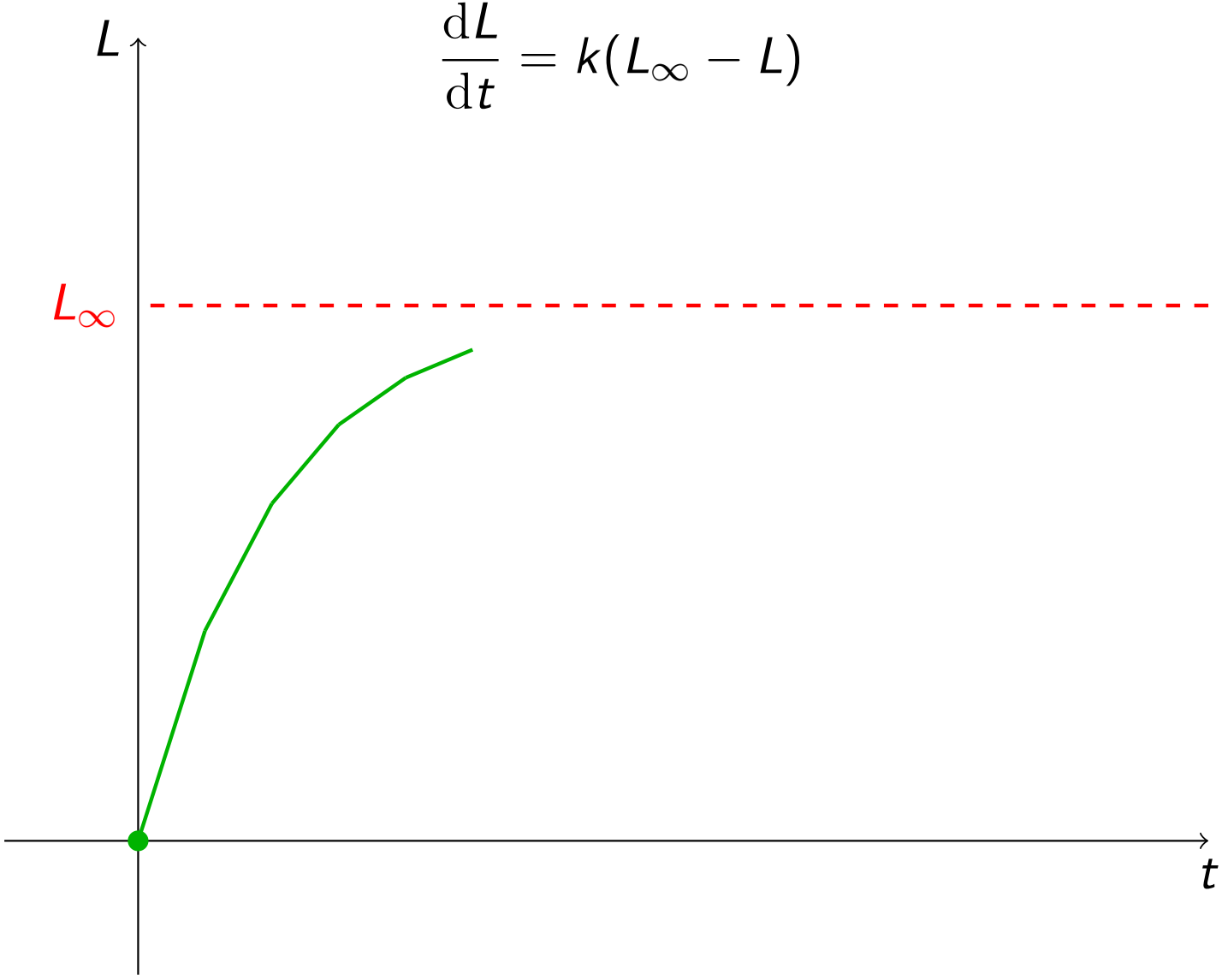

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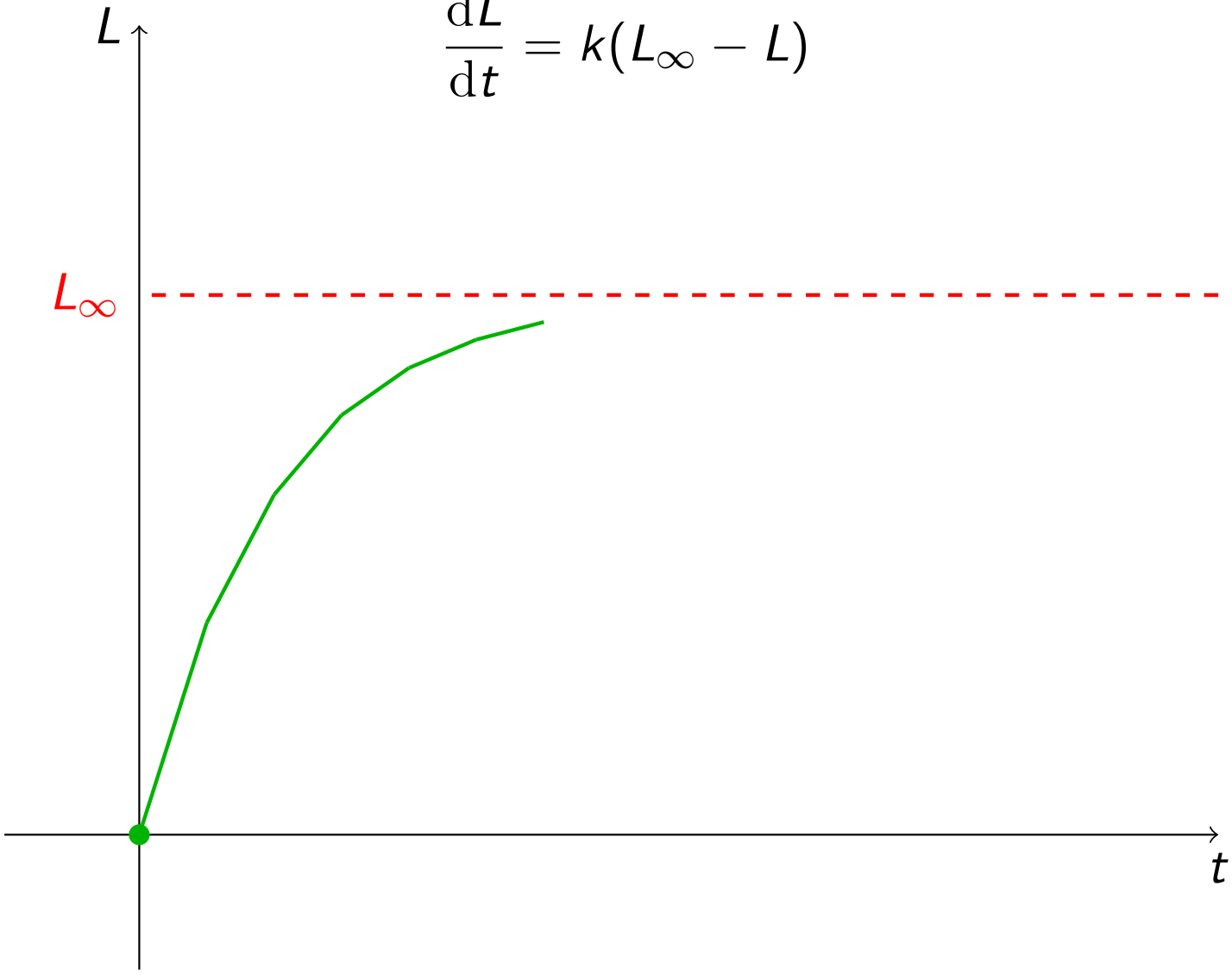

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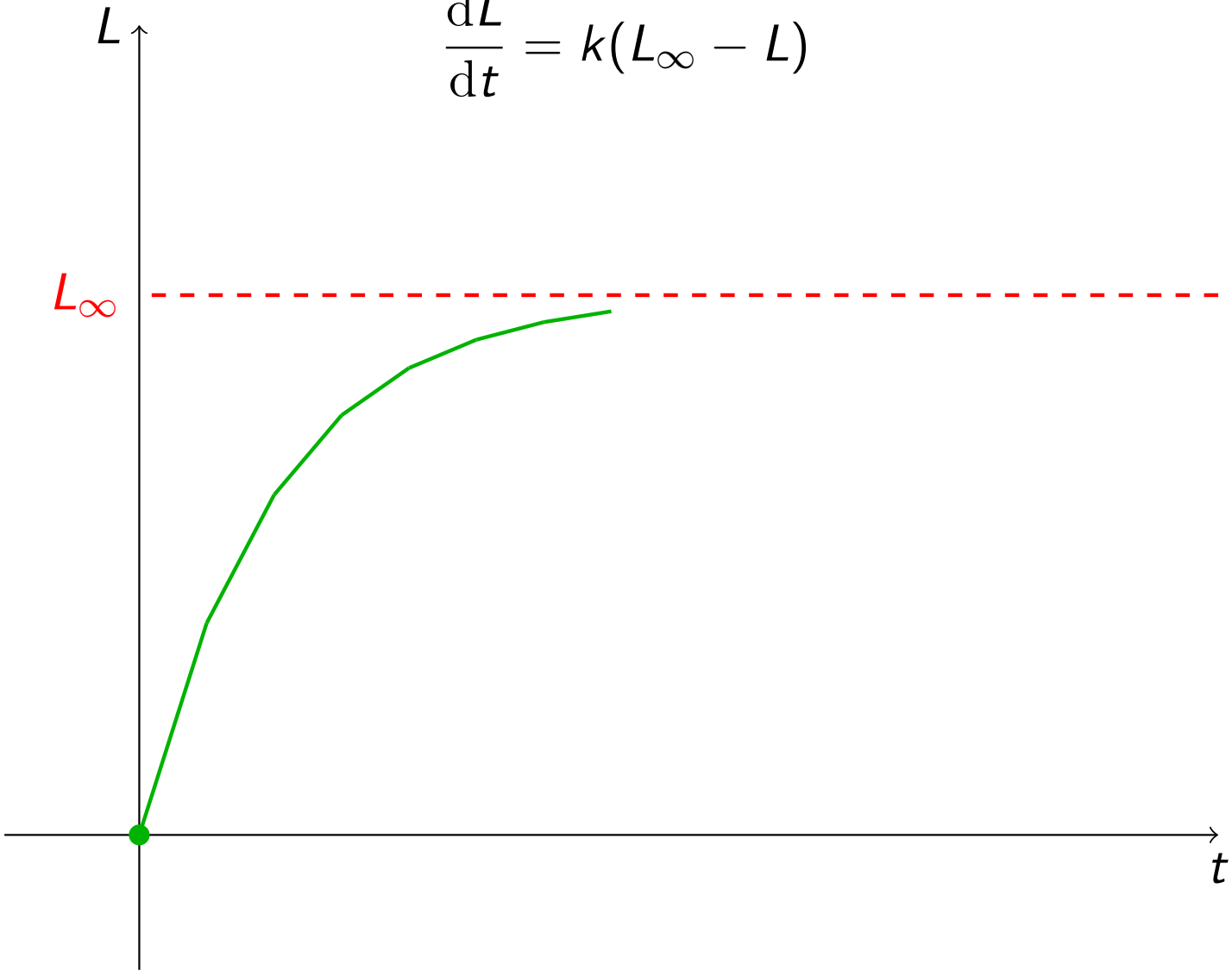

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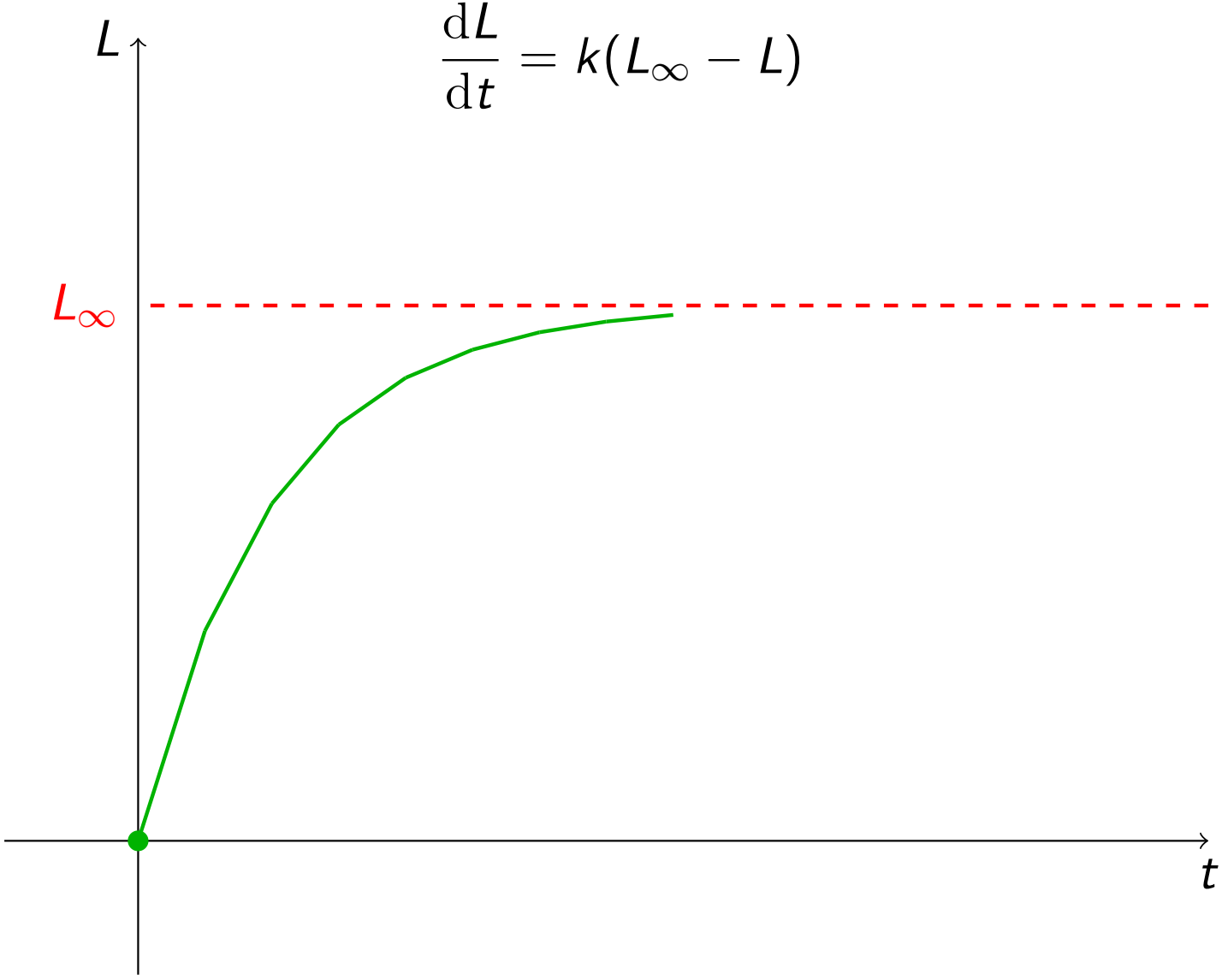

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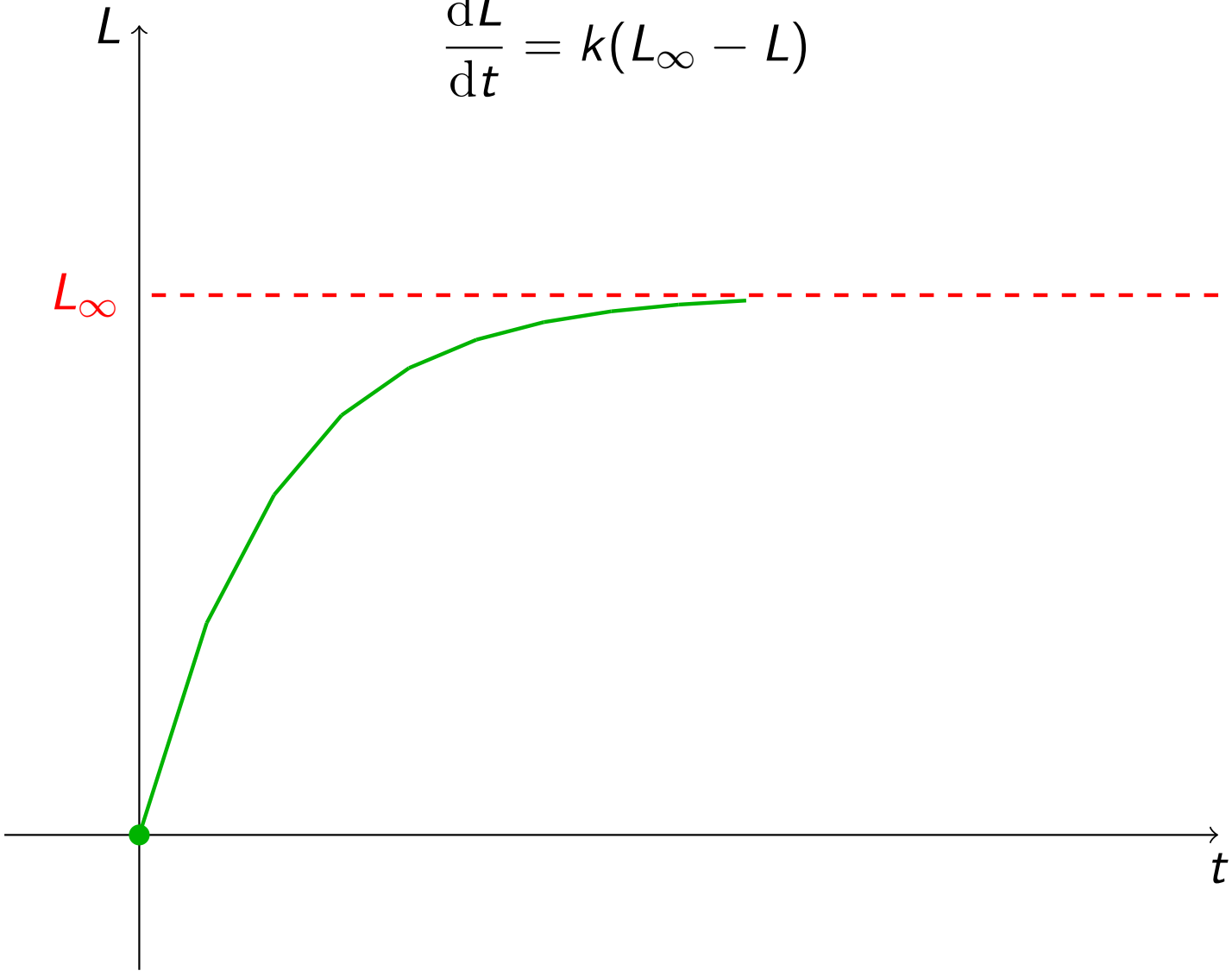

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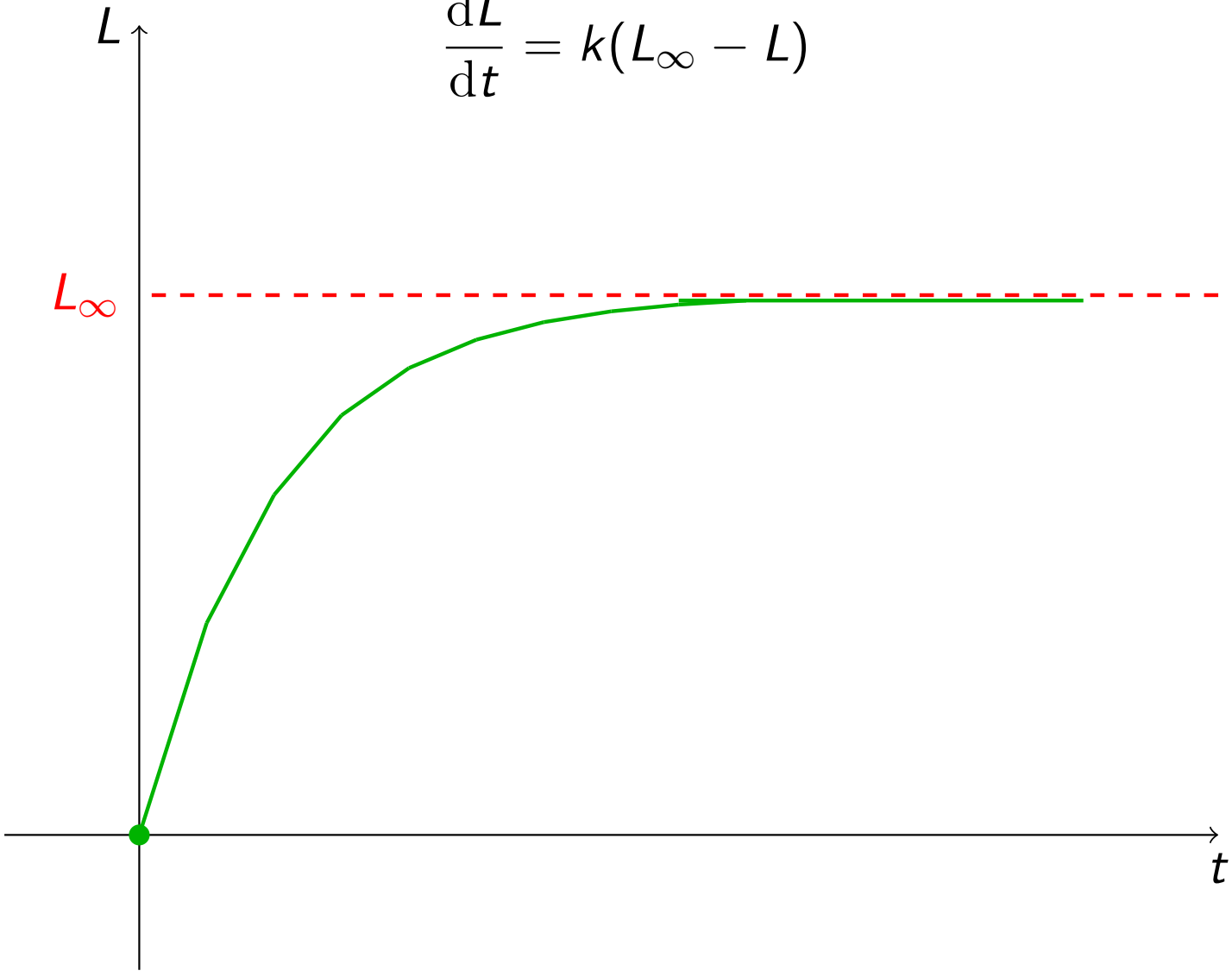

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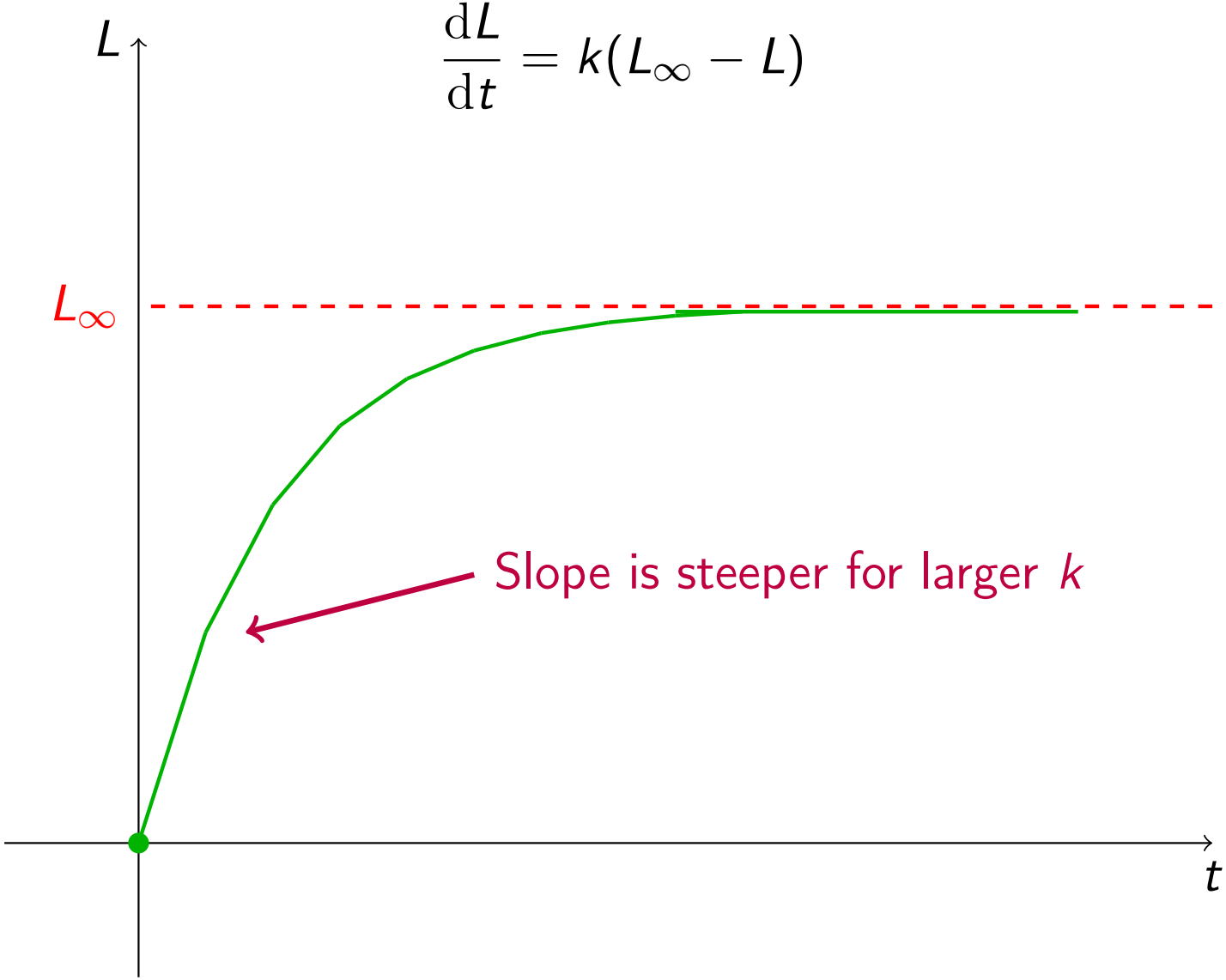

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- k controls how quickly the organism grows