A Comparison of Linear, Parabolic, and Exponential Growth

By Clarity Finder, 2013 http://www.clarityfinder.com

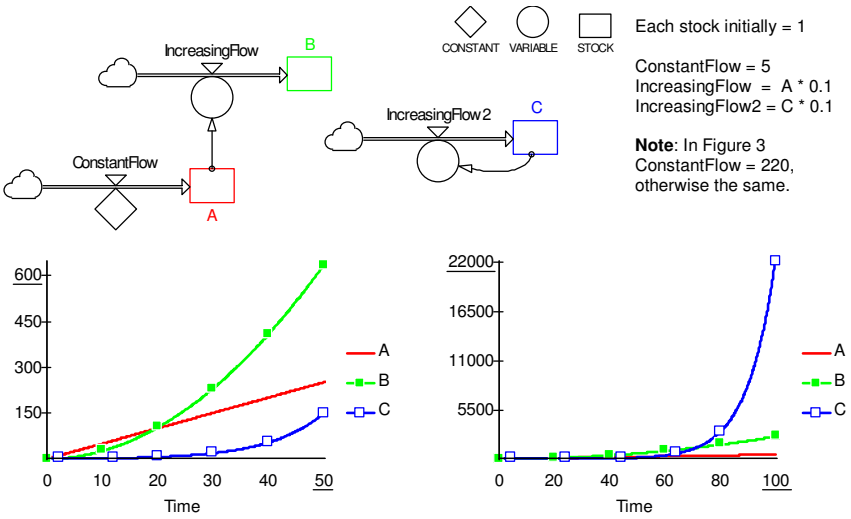

Figure 1: Results with two timespans. Stock A grows linearly, 5 units per time unit. Being proportional to A (10 %), the flow to B increases linearly too causing B itself to grow parabolically. Stock C grows exponentially at the rate of 10 % per time unit, and so does the flow.

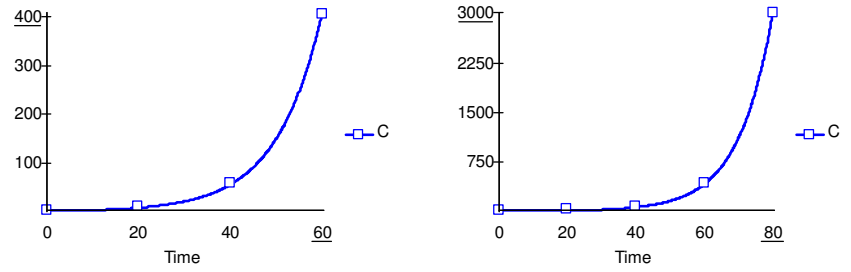

Figure 2: Exponential growth. It looks like the “explosion” starts in the first graph at time 40 and in the second at time 60, yet both graphs depict the same growth until time 60. In other words, at that time the level of stock C is about 400 in both. Compare also with the timespan of 100 above.

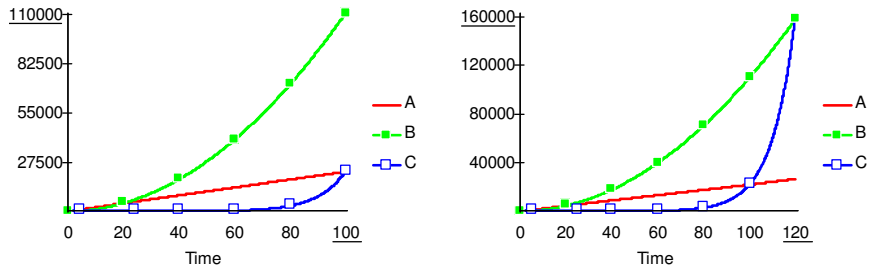

Figure 3: Stock C rises to 22 000 during the timespan of 100 like in Figure 1. This time A reaches the same level since the constant flow equals now 220 per time unit. (Multiply it by 100.) The growth of B is affected by this new constant, too, through A. Look what happens with the timespan of 120.

How large will the exponentially growing stock be at time 140? The size of the stock is always nearly 7.4 times the size it had 20 time units earlier because the rate is 10 % here. Time 140: the level of stock C is about 1 200 000.

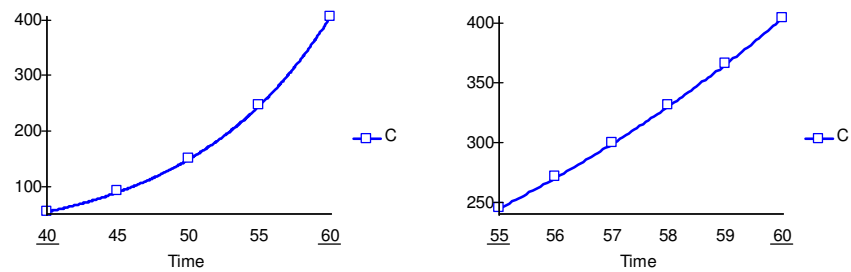

Figure 4: When the timespan is relatively short, the shape of exponential growth is something between parabolic and linear. Compare the timespan from 40 to 60 with the same span in Figure 2. This is the same growth.