Positive (but not only) feedbacks in mathematics of aging

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Abstract: Telemore shortening is a process closely related to cell senescence [1],[2]. We have revisited well-known models of this process [3],[4],[5] both discrete and continuous, deterministic and stochastic, to observe that their asymptotes have atypical polynomial (and not exponential) form. We have found that the reason is related to existence of positive feedbacks in all these models. The result is rather disappointing: proliferation ratio and average length of endings tend to zero with the number of generations. It seems that there is no hope for aging cells. All these models, however, do not take into account natural mortality process for cells of all types. If we assume that probability of survival for different cells is less than one it introduces negative feedbacks into our models. We have discovered that if probability of survival for cells of zero type is less than for cells of other types then we are led to more encouraging asymptotes and the limits of proliferation ratio and average length of ending become positive.

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