

RESEARCH

Interaction topologies at promoters

Peter Hansen^{1??†}, Uwe Kornak^{1??†}, Salaheddine Ali^{1*†} and Peter N Robinson^{1,2}

*Correspondence:

sali@molgen.mpg.de

¹Department of Zoology,
Cambridge, Waterloo Road,
London, UKFull list of author information is
available at the end of the article

†Equal contributor

Abstract**First part title:** Text for this section.**Second part title:** Text for this section.**Keywords:** sample; article; author**Content**

Text and results for this section, as per the individual journal's instructions for authors.

Section title

Text for this section ...

Sub-heading for section

Text for this sub-heading ...

Sub-sub heading for section

Text for this sub-sub-heading ...

Sub-sub-sub heading for section Text for this sub-sub-sub-heading ... In this section we examine the growth rate of the mean of Z_0 , Z_1 and Z_2 . In addition, we examine a common modeling assumption and note the importance of considering the tails of the extinction time T_x in studies of escape dynamics. We will first consider the expected resistant population at vT_x for some $v > 0$, (and temporarily assume $\alpha = 0$)

$$E[Z_1(vT_x)] = E\left[\mu T_x \int_0^{v \wedge 1} Z_0(uT_x) \exp(\lambda_1 T_x(v-u)) du\right].$$

If we assume that sensitive cells follow a deterministic decay $Z_0(t) = xe^{\lambda_0 t}$ and approximate their extinction time as $T_x \approx -\frac{1}{\lambda_0} \log x$, then we can heuristically estimate the expected value as

$$\begin{aligned} E[Z_1(vT_x)] &= \frac{\mu}{r} \log x \int_0^{v \wedge 1} x^{1-u} x^{(\lambda_1/r)(v-u)} du \\ &= \frac{\mu}{r} x^{1-\lambda_1/\lambda_0 v} \log x \int_0^{v \wedge 1} x^{-u(1+\lambda_1/r)} du \\ &= \frac{\mu}{\lambda_1 - \lambda_0} x^{1+\lambda_1/rv} \left(1 - \exp\left[-(v \wedge 1) \left(1 + \frac{\lambda_1}{r}\right) \log x\right]\right). \quad (1) \end{aligned}$$

Thus we observe that this expected value is finite for all $v > 0$ (also see [1, 2, 3, 4, 5]).

Competing interests
The authors declare that they have no competing interests.

Author's contributions
Text for this section ...

Acknowledgements
Text for this section ...

Author details
¹Department of Zoology, Cambridge, Waterloo Road, London, UK. ²Marine Ecology Department, Institute of Marine Sciences Kiel, Düsternbrooker Weg 20, 24105 Kiel, Germany.

References

1. Koonin, E.V., Altschul, S.F., Bork, P.: Brca1 protein products: functional motifs. *Nat Genet* **13**, 266–267 (1996)
2. Kharitonov, S.A., Barnes, P.J.: Clinical Aspects of Exhaled Nitric Oxide. in press
3. Zvaifler, N.J., Burger, J.A., Marinova-Mutafchieva, L., Taylor, P., Maini, R.N.: Mesenchymal cells, stromal derived factor-1 and rheumatoid arthritis [abstract]. *Arthritis Rheum* **42**, 250 (1999)
4. Jones, X.: Zeolites and synthetic mechanisms. In: Smith, Y. (ed.) *Proceedings of the First National Conference on Porous Sieves: 27-30 June 1996; Baltimore*, pp. 16–27 (1996). Stoneham: Butterworth-Heinemann
5. Margulis, L.: *Origin of Eukaryotic Cells*. Yale University Press, New Haven (1970)
6. Orengo, C.A., Bray, J.E., Hubbard, T., LoConte, L., Sillitoe, I.: Analysis and assessment of ab initio three-dimensional prediction, secondary structure, and contacts prediction. *Proteins Suppl* **3**, 149–170 (1999)
7. Schnepf, E.: From prey via endosymbiont to plastids: comparative studies in dinoflagellates. In: Lewin, R.A. (ed.) *Origins of Plastids vol. 2, 2nd edn.*, pp. 53–76. Chapman and Hall, New York (1993)
8. *Innovative Oncology*
9. Smith, Y. (ed.): *Proceedings of the First National Conference on Porous Sieves: 27-30 June 1996; Baltimore*. Butterworth-Heinemann, Stoneham (1996)
10. Hunninghake, G.W., Gadek, J.E.: The alveolar macrophage. In: Harris, T.J.R. (ed.) *Cultured Human Cells and Tissues*, pp. 54–56. Academic Press, New York (1995). Stoner G (Series Editor): *Methods and Perspectives in Cell Biology*, vol 1
11. *Advisory Committee on Genetic Modification: Annual Report*. London (1999). Advisory Committee on Genetic Modification
12. Kohavi, R.: *Wrappers for performance enhancement and obvious decision graphs*. PhD thesis, Stanford University, Computer Science Department (1995)
13. The Mouse Tumor Biology Database. http://tumor.informatics.jax.org/cancer_links.html

Figures

Figure 1 Sample figure title. A short description of the figure content should go here.

Figure 2 Sample figure title. Figure legend text.

Tables

Table 1 Sample table title. This is where the description of the table should go.

	B1	B2	B3
A1	0.1	0.2	0.3
A2
A3

Additional Files
Additional file 1 — Sample additional file title
Additional file descriptions text (including details of how to view the file, if it is in a non-standard format or the file extension). This might refer to a multi-page table or a figure.

Additional file 2 — Sample additional file title
Additional file descriptions text.