

Tasks

- 1 Identify why the error propagation formula fails on p6 for $N_R = 1$, and calculate the true variance. This simply requires some thought about the approximations inherent to the formula. Output: 1 sentence and a couple of lines of maths.
- 2 Are cell surface receptors independent? A helpful discussion can be found in Ref [1]. Output: a short paragraph.
- 3 Complete the gaps in the Berg-Purcell derivation on p10 & p11. Output: about 1 or 2 sides of maths; no special tricks are needed.
- 4 Prove that the mutual information is non-negative (use Ref. [2] for guidance). Output: a few lines of maths.
- 5 Prove the data processing inequality. Use the hints on p27. Output: a few lines of maths.

References

- [1] H. C. Berg and E. M. Purcell, Biophys. J. 20:193-219 (1977).
- [2] <http://web.stanford.edu/~phayden/qit761.2009/lecture2.pdf>