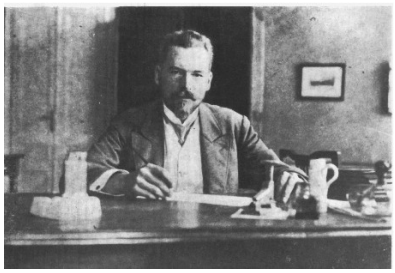

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Essential requisites for best performance of Geometric Brownian Information Engine.

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We investigate a Geometric Brownian Information Engine (GBIE) in the presence of an error-free feedback controller that transforms the information gathered on the state of particles entrapped in mono-lobal geometric detention into extractable work[1,2]. We determine the benchmarks for utilizing the available information in an output work and the optimum operating requisites for best performance. Apart from a reference measurement distance xm and feedback site xf , upshots of the information engine also depend on the transverse constant bias force (G)[3]. G tunes the entropic contribution in the effective potential and the standard deviation (σ) of the equilibrium marginal probability distribution. We find that the upper bound of the achievable work shows a crossover from (5/3-2ln2)kBT to 1/2kBT when the system changes from entropy to an energy-dominated one. The higher loss of information during the relaxation process accredits the lower value of work in entropic instances of GBIE. We recognize that the work extraction reaches a global maximum when xf=2xm with xm ⊠ 0.6σ, irrespective of the extent of the entropic limitation. Also, we explore the effect of entropic control on the unidirectional passage of the particle and efficacy of the GBIE[4].

1. R. Zwanzig, J. Phys. Chem. 96,3926 (1992).
2. T. Sagawa and M. Ueda, Phys. Rev. Lett. 104, 090602 (2010).
3. T. Sagawa, and M. Ueda, Phys. Rev. E„ 85, 021104(2012).
4. R. Rafeek, S. Y. Ali, and D. Mondal, Communicated (2022).

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