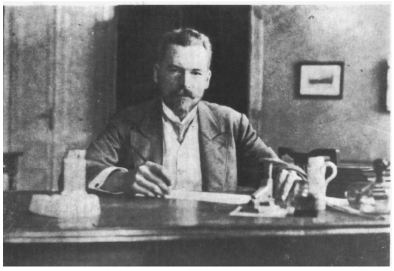

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Geometric Brownian Information Engine

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We design a geometric Brownian information engine by considering over-damped Brownian particles inside a two-dimensional monolobal confinement with irregular width along the transport direction. Under such detention, particles experience an effective entropic potential which has a logarithmic form. We employ a feedback control protocol as an outcome of error-free position measurement [1-2]. The protocol comprises three stages: measurement, feedback and relaxation. We reposition the center of the confinement to the measurement distance instantaneously when the position of the trapped particle crosses for the first time. Then, the particle is allowed to thermal relaxation. We calculate the extractable work, total information and unavailable information associated with the feedback control using this equilibrium probability distribution function. We find the exact analytical value of the upper bound of extractable work as [2]. We introduce a constant force G downwards to the transverse coordinate (y). A change in G alters the effective potential of the system and tunes the relative dominance of entropic and energetic contributions in it. The upper bound of the achievable work shows a cross-over from to when the system changes from an entropy dominated regime to energy dominated one [3]. Compared to an energetic analogue, the loss of information during the relaxation process is higher in the entropy-dominated region, which accredits the less value in achievable work. We also determine the benchmarks for utilizing the available information in an output work and the optimum operating requisites for best performance [4].

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