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### **Entraining synthetic genetic oscillators.**

Wagemakers A, Buldú JM, Sanjuán MA, de Luis O, Izquierdo A, Coloma A.

Departamento de Física, Universidad Rey Juan Carlos, Tulipán s/n, 28933 Móstoles, Spain.

We propose a new approach for synchronizing a population of synthetic genetic oscillators, which consists in the entrainment of a colony of repressilators by external modulation. We present a model where the repressilator dynamics is affected by periodic changes in temperature. We introduce an additional plasmid in the bacteria in order to correlate the temperature variations with the enhancement of the transcription rate of a certain gene. This can be done by introducing a promoter that is related to the heat shock response. This way, the expression of that gene results in a protein that enhances the overall oscillations. Numerical results show coherent oscillations of the population for a certain range of the external frequency, which is in turn related to the natural oscillation frequency of the modified repressilator. Finally we study the transient times related with the loss of synchronization and we discuss possible applications in biotechnology of large-scale production coupled to synchronization events induced by heat shock.

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Publication Types, MeSH Terms

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