

Method of Green's function in two-domain system relaxation problem

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Long-term storage of energy in protein molecules is one of the main problems of molecular biology. Therefore, study of the physical mechanism working there is important [1,2]. Such a system is modeled as a highly excited two-domain system with partial contact with a thermostat [3]. The system consists of two connected domains. The first domain is isolated from the thermostat yet still interacts with the second one, which is in direct contact with the thermostat. The interaction of the second domain with the thermostat is modeled by two additional terms in the equation, one of which being a random force with gaussian distribution and the other one being a dissipative term. This system was studied in [3] and the main result of which is that in one boundary case the energy of the system decreases linearly and in the other one the square of the energy does so. In this paper, we solve the problem described above in the general case. It turns out that, in general, the problem can be solved by the method of Green's function. A number of numerical experiments were carried out to check the solution. It turned out that the constructed theory is in complete agreement with experiment and with the results of [3].

[1] Benettin G *et al* 1989 *Commun. Math. Phys.* **121** 557–601

[2] Baldan O and Benettin G 1991 *J. Stat. Phys.* **62** 201–219

[3] Nakagawa N *et al* 2000 *J. Phys. Soc. Jap.* **69** 3214–3222