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Eigen model with general fitness functions and degradation rates[1] CHIN-KUN HU, Institute of Physics, Academia Sinica, Taipei, DAVID B. SAAKIAN, Academia Sinica, Taipei and Yerevan Physics Institute, Armenia — We present an exact solution of Eigen's quasispecies model with a general degradation rate and fitness functions, including a square root decrease of fitness with increasing Hamming distance from the wild type. The found behavior of the model with a degradation rate is analogous to a viral quasi-species under attack by the immune system of the host. Our exact solutions also revise the known results of neutral networks in quasispecies theory. To explain the existence of mutants with large Hamming distances from the wild type, we propose three different modifications of the Eigen model: mutation landscape, multiple adjacent mutations, and frequency-dependent fitness in which the steady state solution shows a multi-center behavior.

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