# A stochastic model for the evolution of species by mutation

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We propose a model for an evolution of pathogens having mutation as a survival strategy. The process evolves on the oriented binary tree with root, where each level of the tree represents a type of pathogen. More precisely, each level represents the fitness of that pathogen, and pathogens in the same level have the same fitness. We also consider that pathogens in a higher level have a higher fitness. The tree occupation is done as follows. With probability 1/2 the new pathoegen, that is a mutation, will occupy one of the two vertex below the vertex mother. If one of these vertex is occupied, with probability 1 the pathogen goes to the empty vertex.The immune system takes an exponential time to recognize and produce antibodies capable of eliminating pathogens. In each mark of this Poisson point process all the pathogens with lower fitness in the system is eliminated. We prove the existence of phase transitions on the model and we also prove that exists an interval where all branches at the process will be extinct with probability 1, but the process survive with positive probability.