
Ancestors' genetic weights in biparental populations

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Résumé

Our goal is to study the genetic composition of a population in which each individual has 2 parents, who contribute equally to the genome of their offspring. We use a bi-parental Moran model, which is characterized by its fixed number N of individuals. We fix an individual and consider the proportions of the genomes of all individuals living n time steps later, that come from this individual. When n goes to infinity, these proportions all converge almost surely towards the same random variable. When N then goes to infinity, this random variable multiplied by N (i.e. the stationary weight of any ancestor in the whole population) converges in law towards the mixture of a Dirac measure in 0 and an exponential law with parameter $1/2$, and the weights of a finite number of ancestors are independent. As a consequence, we obtain that the sequence of increasing weights of all ancestors, when properly rescaled, converges to the function $-2 \ln(2(1 - u))$ for $u > 1/2$.

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