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Boundary estimates for a degenerate parabolic equation with partial Dirichlet boundary conditions

We study the boundary regularity properties and derive pointwise a priori supremum estimates of weak solutions and their derivatives in terms of suitable weighted L^2 -norms for a class of degenerate parabolic equations that satisfy homogeneous Dirichlet boundary conditions on certain portions of the boundary. In addition we prove suitable boundary Harnack principles for nonnegative solutions. Such equations arise in population genetics in the study of models for the evolution of gene frequencies. Among the applications of our results is the description of the structure of the transition probabilities and of the hitting distributions of the underlying gene frequencies process.