

EXTINCTION ESCAPE TIMES

K.Z. Leder, University of Minnesota, USA, lede0024@umn.edu

J. Foo, University of Minnesota, USA, jyfoo@math.umn.edu

M. Kelly University of Minnesota, USA, mbkelly@math.umn.edu

Consider a large population of cells that is decaying exponentially according to a subcritical branching process. In the examples we are interested in this decay is driven by the presence of a drug that reduces cellular viability. Without intervention the population will eventually go extinct, however in many important scenarios mutant cells can be created that are resistant to this drug. These mutant individuals then go onto create supercritical branching processes and thereby allowing the total population to escape from extinction. In such a process these mutant individuals may eventually overtake the entire population. In this talk I will discuss approximations to the time when this population takeover occurs under various assumptions on the dynamics of the mutations and growth behavior of the mutant population.