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MATHEMATICAL MODEL FOR THE SPREAD OF INFECTIOUS DISEASE IN VARYING ENVIRONMENTS

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Abstract

This paper is concerned with a stochastic model, describing outbreaks of infectious diseases that have potential great health consequences, and which can result such severe economic losses that immediate sets of measures need to be taken curb the spread. During outbreaks of such disease, the environment that the infectious agent experiences is therefore changing due to the subsequent control measures taken. We use the mathematical model by defining the spaces (Ω, τ, P) a complete probability spaces and (E, ε) a measurable space. For any set X in ε, $M(A)$ has an exponential distribution with parameter $\theta(A)$ and it is used the suitable assumption and the corresponding results are obtained.

Keywords and phrases: exponential distribution, varying environments, branching process, classical swine fever, foot and mouth disease, avian influenza.

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References

[1] M. S. Abdel-Hameed, Life distribution properties of devices subject to a levy wear success, Math Res. 9(3) (1984), 604-614.

[2] M. S. Abdel-Hameed and F. Proschan, Shock models with underlying birth success, J. Appl. Prob. 12 (1975), 18-28.

[3] J. P. Trapman and J. A. P. Heesterbeek, A branching model for the spread of the infectious animals diseases in varying environments, Faculty of Veterinary Medicine, Utrecht University, Yalelaan 7, 3584 CL, The Netherlands, J. P. Trapman, R. W. J. Meester: Division of Mathematics, Vrije Universiteit Amsterdam, De Boelelaan 1081a, 1081 HV Amsterdam, The Netherlands, 2004, pp. 553-576.

[4] D. Klinkenberg and A. Everts-van der Wind, E. A. M. Gratt and M. C. M. De Jong, Quantification of the effects of control strategies on Classical Swine Fever Epidemics, J. Math. Biosci. 186(2) (2003), 145-173.

[5] Mohamed Abdel-Hameed, Life distribution properties of devices subject to a pure jump Damage Process, J. Appl. Prob. 21 (1984), 816-825.

[6] A. Stegeman, A. R. W. Elbers, J. Smak and M. C. M. de Jong, Quantification of the transmission of classical swine fever virus between herds during the 1997-1998, epidemic in the Netherlands, Preventive Veterinary Medicine 42 (1999), 219-234.