

Bisexual Galton-Watson branching processes with population-size-dependent immigration of females and males

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Abstract

The bisexual Galton-Watson branching processes with immigration of females and males where the immigration depends on the current population size of females and males are investigated. Under certain assumptions on the distribution law of immigration, for the supercritical case (i.e. the asymptotic mean growth rate $r > 1$), the limit behavior of the suitably normed underlying sequences for the process is obtained.

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References

- [1] Alsmeyer, G. and Rösler, U. (1996). *The bisexual Galton-Watson process with promiscuous mating: Extinction probabilities in the supercritical case.* Ann. Appl. Prob., 6, 922-939.
- [2] Bruss, F.T.(1984). *A note on extinction criteria for bisexual Galton-Watson branching processes.* J. Appl. Prob, 21, 915-919.
- [3] Daley, D.J. (1968). *Extinction conditions for certain bisexual Galton-Watson branching processes.* Z. Wahrsch. Verw. Geb., 9, 315-322.
- [4] Daley, D.J., Hull, D.A. and Taylor, J.M. (1986). *Bisexual Galton-Watson branching processes with superadditive mating functions.* J. Appl. Prob, 23, 585-600.
- [5] González, M., Molina, M., Mota, M. (1999) *Bisexual branching models with immigration,* Estadística. 49, 81-107.
- [6] González, M., Molina, M., Mota, M. (2000). *Limit behaviour for a subcritical bisexual Galton-Watson branching process with immigration.* Stat. Probab. Letts. 49, 19-24.

- [7] González, M., Molina, M., Mota, M. (2002) *Bisexual Galton-Watson branching process with immigration of females and males: Asymptotic behaviour*. Markov Process. Relat. Fields. 8,651-663.
- [8] Molina, M.; Mota, M.; Ramos, A. (2002). *Bisexual Galton-Watson branching process with population-side-dependent mating*. J. Appl. Prob. 39, 479-490.
- [9] Molina, M., Del Puerto, I.; Ramos, A. (2007). *A class of controlled bisexual branching processes with mating depending on the number of progenitor couples*. Stat. Probab. Letts. 77, 1737-1743.
- [10] Xing, Y., Wang, Y. (2005). *On the extinction of the class of population-size-dependent bisexual branching processes*. J. Appl. Prob. 42, 175-184.