

EM algorithm for discrete-time event history data

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Abstract

For event histories with three states measured at discrete times, a four-parameter distribution is motivated. The demographic example is fertility, where a woman gives - in the course of time - birth to her at most two children. In case of complete observations, estimation by maximizing the likelihood with a quasi-Newton algorithm is enough. We study a special case of the situation where a part of the event path is unobserved. For women with two children, the age at which birth was given to the first is unobserved. Because the logarithmic likelihood is a linear function in the number of women with one child, an EM-algorithm can be derived easily. Doing so, we compare, from 26,000 births of 740,000 women in Mecklenburg-West Pomerania, the probability for giving birth to the first with that for the second child. As to be expected, the probability of the second child is markedly higher than that for the first.

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