

1163-60-624

Yujia Ding* (yujia.ding@cgu.edu) and **John Angus**. *On the ratio of current age to total life for null recurrent renewal processes.*

A number of open problems associated with determining the limit distribution of the ratio of current age to total life for a null recurrent renewal process (i.e. where inter-arrival times have infinite mean) are solved. In particular, when the survival function for the inter-arrival times satisfies $\bar{F}(t) \sim t^{-\alpha}L(t)$ as $t \rightarrow \infty$ with L slowly varying and $0 \leq \alpha \leq 1$, we prove that the limit distribution corresponds to that of $U^{1/\alpha}$ where U is uniformly distributed on $(0, 1)$, with the limit distribution taken to be degenerate at 0 when $\alpha = 0$. By using direct methods instead of appealing to strong renewal theorems, we are able to prove this result without regard to whether the inter-arrival time distribution is latticed or not, and without extraneous constraints on the renewal function. (Received September 10, 2020)