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Nonparametric predictive pairwise comparison with competing risks

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SUMMARY

In reliability, failure data often correspond to competing risks, where several failure modes can cause a unit to fail. Maturi et al [1] introduced nonparametric predictive inference (NPI) for competing risks, where interest is in the question which failure mode causes the next unit to fail. NPI is a statistical approach based on few assumptions, with inferences strongly based on data and with uncertainty quantified via lower and upper probabilities. Recently, Coolen-Maturi & Coolen [2] considered NPI for competing risks in the case of unobserved, re-defined, unknown or removed failure modes. This paper presents NPI for pairwise comparison with competing risks data, assuming that the different failure modes are independent. The focus is on the lower and upper probabilities for the event that the lifetime of a future unit from one group, say X, is less than the lifetime of a future unit from the second group, say Y, with different independent competing risks. The paper also shows how the two groups can be compared given a particular failure mode.

Keywords: Pairwise comparison, competing risks, lower and upper probabilities, lower and upper survival functions, nonparametric predictive inference, right-censored data.

AMS Classification: 62N99, 62G99, 62N05.

References

[1] T.A. Maturi, P. Coolen-Schrijner and F.P.A. Coolen (2010). Nonparametric predictive inference for competing risks. *Journal of Risk and Reliability*, **224**(1), 11-26.

[2] T. Coolen-Maturi and F.P.A. Coolen (2011). Unobserved, re-defined, unknown or removed failure modes in competing risks. *Journal of Risk and Reliability*, to appear.

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