Review report on a paper entitled

" **Generalising Frailty Assumptions in Survival Analysis: a Geometric Approach** "

By Vahed Maroufy and Paul Marriott

In this paper authors propose the local mixture modeling for frailty in survival analysis. The modeling is suggested to be sensitive to detect the degree of frailty in comparison to the conventional gamma frailty model. The presentation is well organized, but should be more elucidatory for readers who are not familiar with the survival analysis.

Major comments

1. Here is a naive idea for extending a gamma frailty model in which the frailty distribution is modeled by a finite mixture of gamma distributions, cf. Hougaard, P. (1995). Frailty models for survival data. Lifetime data analysis, 1(3), 255-273. What is a difference between such modeling and the local mixture modeling?

2. Authors claim in the real data analysis that that the gamma frailty model has the effect of considerably under-estimating standard errors when compared to our more general assumptions. Is there any theoretical support for the assertion, building any asymptotics for investigating the consistency and asymptotic normality, cf. Zucker, D. M., Gorfine, M., & Hsu, L. (2008). Pseudo-full likelihood estimation for prospective survival analysis with a general semiparametric shared frailty model: Asymptotic theory. Journal of Statistical Planning and Inference, 138(7), 1998-2016.

3. The number of component is fixed to four in a prescribed manner. Is there any other option to select the component number based on data?

Minor comments

1. On page 2; have a boundaries $\longrightarrow$ have boundaries
2. On page 4; a p-vector regression coefficients $\longrightarrow$ a p-vector of regression coefficients

3. In references; Modeling patial variation in leukemia urvival data. Journal of the American Statistical Assiciation ⟶ Modeling partial variation in leukemia survival data. Journal of the American Statistical Association

4. In references; Survival models for heterogeneus population ⟶ Survival models for heterogeneous population

5. In references; An extenssion of Cox ' s regression model ⟶ An extension of Cox ' s regression model