Department of Statistical Science

Southern Methodist University

Instructions for Ph.D. Qualifying Exam 2020 -

1. *General Description of the Exam*

The Ph.D. Qualifying Examination is designed to test your ability to read and understand the statistics literature, and to think and write logically and insightfully about it. You will find attached three technical papers on a related topic. Your exam requires writing a review paper based on these readings. The required sections and content of the paper are outlined below.

All the work on your qualifying paper should be your own. You should receive no help from another person in understanding the papers, nor in writing up the results. The only persons with whom you may discuss the papers are members of your Ph.D. qualifying exam committee. You may consult additional published literature, if needed. For example, it is permissible and may be helpful to consult a textbook to clarify an unfamiliar concept discussed in a paper. However, no literature search outside of the papers provided is expected or recommended.

Every word of your qualifying paper should be composed by you, unless formally cited as having come from another source, in which case the passage should be placed in quotes "-". This point cannot be emphasized enough. For this exam, copying and/or rewriting passages from other documents will not be tolerated and could be grounds for failure of the exam and/or expulsion from the program. Such plagiarism is both a violation of law and also a violation of University rules. All those taking this exam can assume that their exam will be screened for plagiarism using similarity scores from existing software.

2. *Structure and content of the paper*

a. *Required sections of the paper*

I. Introduction. This section should give an overview of the problem area, explain why the problem is important, describe the problem area in the context of the fundamental areas of Statistics, and discuss the potential impact of various solutions.

II. Analysis of Core Papers. In this section, each core paper should be discussed in turn, with an emphasis on the findings of and the questions raised by the paper.

III. Synthesis of Core Papers. This section should present a summary of the overall findings of the papers, how these findings relate to each other, and which aspects of the problem area have been settled by the core papers.

IV. Technical details. Students should reproduce some technical outcome discussed in one of the three papers given. This could be either to reproduce simulation results, or to provide a derivation/proof of some result that is referred to but not provided in the chosen paper. Your write-up should be explicit about what result you are (re)producing and where it is cited (by page) in the paper.

Note that there is a bit of freedom allowed in exactly how you accomplish the above. For example, if it makes sense to use methods from two of the papers to analyze data presented in the third, then that is permissible. Or you could use theory provided in one paper to prove results in another. The point is that you demonstrate that you are able to fill in the details of a simulation or theorem and apply those results in a reasonable way.

V. Future Directions. This section details some of the future directions for research in the problem area, including open problems. Ideas for approaching the open problems must be provided. You must also demonstrate why this approach is reasonable and has promise. This could be illustrated by finding solutions for special cases, simulations, or even a sketch of a proof. You should also discuss challenges that you can foresee in your proposal. If your paper merely says "The problem of X and Y are good directions for further investigation," this will not result in a passing mark. The section should be 2–4 pages long.

b. Format

25–30 pages (11pt font, double spaced, 1 inch margins), with additional pages available for figures and bibliography. Use a consistent formatting and citation style. The most commonly used standard in technical writing in statistics is APA style (https://owl.english.purdue.edu/owl/resource/560/01/)

3. Evaluation

The paper will be read by two faculty members who will evaluate it on the basis of several criteria:

(a) The accuracy of your description of the content and contributions (individually and collectively) of the papers (Sections I and II).

(b) The thoroughness and insight you are shown in your description of the relationships among the papers. (Section III).

(c) The technical skill and accuracy displayed in the reproduction of a result of the paper (Section IV).

(d) The understanding you show in your proposed research directions and the feasibility and originality of those research directions (Section V).

(e) The quality of the writing and presentation (all sections). This includes the logical construction of the paper as well as its grammar and choice of content (not too many or too few details).

4. Revisions

If a revision is required, you must submit both the paper revised as instructed by the reviewers, as well as a point-by-point response to the reviewers describing how you addressed their comments in the revision.