



THE CONSORTIUM FOR
MATHEMATICS AND
ITS APPLICATIONS

March 30, 2015

Dear Faculty Advisor,

Thanks for participating in the MCM. The author of this evaluation served as a judge during the A Problem judging of the MCM. With respect to Contest Paper 34691, he or she is providing constructive feedback from both an absolute sense of how this paper treated a requirement and how it compared to the field of papers entered in the contest. Additionally, comments are provided relative to several issues that discriminated the better papers from the rest.

A word of caution: Your team's paper is being compared against the entire field of **7636** A Problem contest papers submitted. The typical university has one or two A Problem teams consisting of three of the best modeling students at that school. Comments provided in what follows are aggregating against all papers seen by the author during the contest. There are discriminators identified below that perhaps only a very few, say one or two, Outstanding teams addressed. Hopefully, what is revealed in this note are particulars regarding how your team performed absolutely against the requirements of the problem and how they performed relative to the field against the discriminators identified. We hope these comments will highlight areas in which future team's work could be improved.

The first table in what is to follow is an analysis of paper **34691** in relation to the stated requirements of the problem and in relation to the performance of other teams.

The second table has data indicating how your team's paper performed relative the discriminators listed. Discriminators are identified during the entire judging process.

Above all, it is frankly amazing what a small group of students can achieve in such a short period of time regardless of the outcome of contest judging. Experience has demonstrated that much of the credit for them being able to do so rests on the faculty advisor. So, thank you for volunteering your time, energy, and talents to helping develop our future mathematicians, scientists, and engineers.

Requirements for Problem A

REQUIREMENT	Fulfillment	Relative to other papers
Proper documentation throughout the paper and in the references section	Excellent references in this project, good research. Citations good early on, insufficient in later sections	Not competitive with better papers, which incorporate more real data in models and which cite sources throughout
Non-technical letter explains the results and model in approximately one page	Not provided, a required element of the project	To do well, a project must satisfy the stated requirements
Executive Summary motivates the reader, contains results consistent with paper.	This summary reads well, and says what types of models are employed, but gives no real conclusions	Better papers give information on what the models determine
Coherently & well written paper addressing:		
1. Restatement of the Problem	Good	Have more detailed discussion of the problem and the approach taken
2. Assumptions with rationale or justification that lead to the model used	Good	Have more detailed treatment.
3. Model Design and Justification with a clear modeling process to obtain results	Good	More than the simple SIR model. More detailed distribution model, incorporating data on population distribution and transport options
4. Model Testing and/or Sensitivity/Error Analysis	Good discussion	
5. Relevant strengths and weaknesses	Some, better than most	More detailed discussion
6. Provides algorithms or flow diagrams for any computer code implementation (not the code)	Did not really develop these	
7. Conciseness and organization of document	Good, though incomplete	
8. Answers each specific problem posed	Modeling of virus spread and of how to distribute medicine	More information on specifics of delivery system would be better

Discriminators for Problem A

Discriminator/ Issue	Performance against the Field
Did the team model the spread of Ebola in the region (by countries or sections) to prioritize medicines and delivery?	Yes, but with only a basic model
Did the team address the involvement of multiple countries in their modeling?	Somewhat, though virus model centered only on Guinea
Did the team use their results for the spread of the disease in the decision process for medicine delivery and schedules?	Not clearly, but hardly any teams did this well
Did the team provide an overall assessment of what their models will accomplish?	Yes
Did the team perform useful sensitivity issues for subjective as well as objective inputs?	Good discussion
Did the team use a method that allowed for analysis and testing the model? How did they deal with uncertainty issues in data selection?	Yes, at least they are aware of important issues
Are graphs and charts clearly labeled and properly cited and do they add clarity to the discussion?	Yes
Can their model be validated?	In principle, yes
If they used another's model from the literature, did the team show value-added in its use?	The virus SIR-type model is similar to the literature, but combining it with the Markov chain network model is new

This is an intense contest, and I want to point out things that would be needed to create a more competitive project.

This paper contains interesting discussion and reads better than most. Maybe the team ran out of time? The summary contains too few details, and there is no letter at all (a requirement), which may be why the rating is not higher. It would be better to treat several of the key Ebola outbreak countries, not only Guinea. Specific strategies for distributing the medicine in each of the main countries dealing with Ebola need to be given, and the model should show how the medicine will help.

Anyway, the team should be congratulated for its hard work. With some more effort/time, this could be expanded into an excellent paper.

Overall, the team paper received a contest rating of Successful participant

Sincerely,

MCM Contest Coordinator