Interactive comment on "Optimization analysis of active solar still using design of experiment method" *by* Mohammad Omar Abu Abbas et al.

Mohammad Omar Abu Abbas et al.

myalabedallah16@eng.just.edu.jo

Dear Referee, Thanks for considering my article for possible publication in your journal. I would like to thank all the effort made by you and your staff and the referee's thoughtful comments. A revised version was prepared considering all issues that have been raised by the reviewer.

Reviewer comment

"In Optimization Design Section (Line 384), A confirmatory test must be conducted experimentally with the optimal conditions obtained theoretically. This work is not valid without comparing with experimental values. On the other hand, it seems that the DOE method is not based on experimental values, so how the theoretical results are

obtained?."

Author response

" engineers usually rely on simulation software (such as Matlab, GT series, EES, and etc.) to imitate the operation of any process, and then optimize the design. However, because most of the variables that influence the performance of system are numerical data, there will be infinite variable portfolios. Though the application of simulation software can significantly reduce the experiment cost and enhance the experiment efficiency when each variable has a specific value, it can hardly deal with the situation of infinite potential variable combinations. So, we must consider carefully how to design the experiment plan properly, by which we can identify the key variables and their optimum value intervals with a few experiments as possible. To solve this problem, in this paper, we introduce the DOE (Design of Experiment) methodology to arrange and conduct the experiments rationally in the future with optimal conditions. With the statistical analysis of simulational experiment data, we set up the functional relationship model, discuss about the influences of different variables on the performance of the system, then search out and test the combination of the optimum variable in the future."

We also explain previous points in the Methodology specifically at section [2.3 Design of Experimental] inline 237 in our manuscript.

Furthermore, we have 11 variables and 2 levels for each one, so we need 2^{11} setups and this will take a lot of time and cost. Therefore, it is impossible to apply experimnt setup in our study. So the purpose of our study is to determine the significant and insignificant factors to achieve the experiment in the future with optimal conditions.