Reviewer 1

Comment 1: State carefully the novelty in this work compare to others in literature including the authors’ ones.

Response to Comment 1: Thank you very much for your comment. The significance of the present work is clearly stated as follow:

“The range of applications of FGM include nuclear, automobile structure, aerospace and optoelectronics. With the thermal capabilities, the use of FGM in heatsink fin design would serve as a viable cooling material. However, an in-depth review of existing works shows that research on the application of FGM for heatsink design is not exhaustive in the literature. Therefore, the present work is motivated from the capabilities of the FGM and several established thermal characteristics of porous fins. The present work focuses on the analysis of a porous heatsink of FGM operating under a convective-radiative environment for improved cooling low and high power electronic systems”.

Comment 2: The quality of writing is very low. A lot of equations in the modeling section are not explained.

Response to Comment 2: Thank you so much for your constructive criticism. The revised has been duly revised and checked for grammatical errors. Moreover, all the equations are explained along with the formulation with the associated assumptions clearly stated. However, the equations that are not the direct product of the present manuscript have been properly referenced.

Comment 3: Most of the symbols are not defined and very poor nomenclature is provided at the end of the manuscript.

Response to Comment 3: We have included all the definitions of all symbols used in the study as well as provide a complete nomenclature have been provided in the revised manuscript as requested.

Comment 4: The model which is single nonlinear ODE can be solved in any other method such as the one given by Eqs. (23)-(24). Why do you select the Adomian decomposition method?

Response to Comment 4: The analytical solutions obtained in Eq. (23) - (24) are the closed-form solutions of the linearized form of the nonlinear model of the present study. However, when the nonlinear term is incorporated, the developed analytical scheme (special functions) fails. This necessitates the need for an alternative analytical scheme as the numerical approach is employed for verification. ADM is employed in the present study because it transforms only the nonlinear terms into an Adomian function with all the linear terms preserved which increases the accuracy of the method. However, a strong limitation of ADM is the ability to obtain the right Adomian level, which when obtained, speeds up the convergence of the required solution.
Response to Comment 5: An explanation of the model in Eq. (1) has been included in the manuscript.

Response to Comment 6: We consider the thermal radiation mechanism because of consideration for practical applications.

Response to Comment 7: For the FGM fin, the formulas are presented to describe how thermal conductivity may be used to enhance or reduce the rate of heat transfer. A reference to this idea is shown below:


Response to Comment 8: The purpose is for validation at the linear level if required.

Response to Comment 9: Thank you very much once again for the approaches employed towards improving the quality of our manuscript. The fin efficiency analysis is vital and has been discussed extensively based on the scope of the present study. However, the reviewer comment on numerical examples would be considered in our subsequent work.