



SDI Review Form 1.6

Journal Name:	Asian Research Journal of Mathematics
Manuscript Number:	Ms_ARJOM_47394
Title of the Manuscript:	Adaptive Control of A Four-Dimensional Hyperchaotic System
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments		
Minor REVISION comments	<ol style="list-style-type: none"> English language must be improved. The introduction must be improved with articles dealing with the application of this study (2D, 3D ...) The original points must be explained well. The revised version should contain recent articles deals with considered problem and must be more extended. The following references must be added <ul style="list-style-type: none"> Numerical modeling of the hydrodynamic stability in vertical annulus with heat source of different lengths. Engineering Science and Technology, 20 (4) (2017) 1324-1333. Numerical Simulation of Oscillatory MHD Natural Convection in Cylindrical Annulus: Prandtl Number Effect, Defect and Diffusion Forum, 387 (2018) 417-427. Numerical modeling of MHD stability in a cylindrical configuration, Journal of the Franklin Institute, 351(2) (2014) 667-681. Oscillatory magneto hydrodynamic natural convection of liquid metal between vertical coaxial cylinders. J. Appl. Fluid Mech., 9(4) (2016) 1655-1665. Oscillatory Mixed Convection Flow in a Cylindrical Container with Rotating Disk Under Axial Magnetic Field and Various Wall Electrical Conductivity. Int. Review of Physics, 4(1) (2010) 45-51. Magnetohydrodynamic stability of natural convection flows in Czochralski crystal growth, World Journal of Engineering 4 (4) (2007) 15–22. 	<p>The authors thank the reviewer's valuable comments and suggestions. All corrections are highlighted in yellow.</p> <p>Authors' response to the reviewer's comment 1: Thanks for your comments. The language has been improved by a professional editing colleague. Grammar errors have been corrected. Spelling mistakes have been modified.</p> <p>Authors' response to the reviewer's comment 2: Thanks for your comments. The authors have added a new paragraph which indicates adaptive control has been successfully in 2D, 3D, and 4D systems such as 2D governing equations, 2D/3D switching, 3D autonomous chaotic system, and 4D hyperchaotic system. The new paragraph is as follows (the new paragraph is the last paragraph in page 2).</p> <p><i>Among the above mentioned control methods, adaptive control is prevalent in the literature owing to its fast control speed and the capability of dealing with unknown parameters [22]. Oudina [23, 24] solved the 2D governing equations numerically using a finite volume method. Based on the adaptive control of the corresponding driving circuit, Zhang et al. [25] indicated that 2D/3D switching and 3D video sources with different parallax images can appear in the same autostereoscopic display system. The results show that the increase of heat source length ratio make the critical Rayleigh number go down. According to adaptive control method, Effati et al. [26] achieved the chaos control of a 3D autonomous chaotic system and a 4D hyperchaotic system. By automatically adjusting gap-state expectations, Zhou et al. [27] confirmed that the extended adaptive control system not only enhanced machining robustness but also greatly improved its machining abilities. Nussbaum functions are used in adaptive controller design for solving unknown control direction. Chen [28] found a kind of Nussbaum functions to deal with time-varying unknown control coefficients in adaptive control.</i></p> <p>Authors' response to the reviewer's comment 3: Thanks for your comments. A new paragraph about the original points has been added in the revised manuscript (the new paragraph highlighted in yellow is the second last paragraph in page 3).</p>



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The novelty of this study lies in the following three aspects. Firstly, this paper sets up a new model in the field of environmental economic. The second contribution is that the obtained attractor is also a new hyperchaotic attractor compared with the previous attractors. Last but not least, this paper makes a comparison among adaptive control, self-linear feedback control, and misaligned feedback control on the control speed.

Authors' response to the reviewer's comment 4: Thanks for your comments. In the past three years, many articles are discovered to adopt adaptive control in the fields of hydrodynamic stability, cruise flight, the human body model, and cancer therapy (see Ref. 29-36, where the highlighted in yellow in the manuscript in the new added references). The corresponding paragraph has been extended. The improved paragraph is as follows (the improved paragraph is the first paragraph in page 3).

Besides, adaptive control is also widely used in hydrodynamic stability, cruise flight, the human body model, and cancer therapy [29, 30]. A low-dimension full-envelope adaptive control which meets the practical task of full-envelope hypersonic flight is proposed by An et al. [31]. Wang et al. [32] designed an event-adaptive backstepping controller in the attitude tracking of spacecraft. Their research results show that the controller could significantly reduce the communication burden and provided a stable and accurate response for attitude maneuvers. A new type of adaptive control that can well instruct the human arm model to imitate the arrived movements was found by Wang et al. [33]. According to an adaptive controller based on bio-inspired, Molina et al. [34] achieved a highly efficient speed regulation of the DC motor under uncertain parameters. Teles and Lemos [35] designed a cancer therapy to eradicate metastatic renal cell carcinoma through adaptive control, the robustness in stability and performance is verified by numerical simulation. Palis [36] showed that the non-identifier-based adaptive control can control the nonlinear oscillations in the particle size distribution. Although the applications on adaptive control have been involved in many fields, the transient performance in adaptive control systems has remained a tricky issue. A large transient error could occur at the start of a control process and especially when there is a time-varying parameter [37].

Authors' response to the reviewer's comment 5: Thanks for your comments. These references have been added in the revised manuscript.

Major modification are highlighted in yellow following your indication . We also upload a publication-ready Latex source file of the revised submission.

List of Major Changes:

1. The introduction has been improved with articles dealing with the application of adaptive control in 2D, 3D, and 4D system.
2. The revised manuscript has contained articles adopt adaptive control in the past three years.
3. The novelty of this study has been clarify.
4. The revised manuscript has presented the overall control block-diagram and control input history.
5. The difference between 3D problem and 4D problem has been explained.



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Optional/General comments		
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PART 2:

	Reviewer's comment	Author's comment <i>(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Are there ethical issues in this manuscript?	<u><i>(If yes, Kindly please write down the ethical issues here in details)</i></u>	There are no ethical issues in this manuscript.