

**Review Form 3**

Journal Name:	<a href="#">Journal of Engineering Research and Reports</a>
Manuscript Number:	Ms_JERR_124244
Title of the Manuscript:	HYBRID NEURO-FUZZY BASED IMPROVED CONTROL DESIGN OF ELECTRO-PNEUMATIC CLUTCH ACTUATION CONTROL SYSTEM FOR HEAVY DUTY VEHICLES.
Type of the Article	Research Article

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**PART 1: Review Comments**

<b>Compulsory</b> REVISION comments	Reviewer's comment	Author's Feedback <i>(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
<p><b>Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.</b></p>	<p>The focus of this presentation is on enhancing the performance of electro-pneumatic clutch actuation systems in heavy-duty vehicles through the application of hybrid Neuro-Fuzzy control principles. Neuro-Fuzzy is an innovative approach that combines the strengths of fuzzy logic and neural networks, leveraging the advantages of both methodologies. Conventional clutch actuation control mechanisms often fall short in ensuring optimal performance of heavy-duty vehicles, particularly on challenging terrains like hills. These shortcomings can lead to dangerous road incidents. Traditional systems typically rely on routine calibration of clutch actuators following maintenance procedures. However, this crucial calibration step is frequently overlooked, resulting in potentially severe consequences. By implementing Neuro-Fuzzy principles in clutch actuation control, we aim to address these issues and significantly improve the safety and efficiency of heavy-duty vehicles across various driving conditions.</p>	
<p><b>Is the title of the article suitable? (If not please suggest an alternative title)</b></p>	<p>Yes, It is suitable.</p>	
<p><b>Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.</b></p>	<p>Yes.</p>	
<p><b>Are subsections and structure of the manuscript appropriate?</b></p>	<p>Yes.</p>	
<p><b>Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.</b></p>	<p><b>Yes.</b> To address the limitations of manual calibration, an intelligent clutch actuation method using a hybrid Neuro-Fuzzy control system was implemented. Reference data for errors, speed, torque, and power were obtained from a Mercedes Benz Actros Truck model MP 2, 2031. This data was integrated into a Simulink block and incorporated into a designed Neuro-Fuzzy Simulink model. Both conventional and Neuro-Fuzzy Simulink model controllers were simulated. The Neuro-Fuzzy controller demonstrated significant improvements across various performance metrics:</p> <ul style="list-style-type: none"> <li>• Piston error decreased by 0.4821mm (33.04%)</li> <li>• Angular speed increased by 334.1 RPM (33%)</li> <li>• Engine torque improved by 0.0594NM (33.26%)</li> <li>• Power output increased by 2.79 watts (16.53%)</li> </ul> <p>These results conclusively show that a Hybrid Neuro-Fuzzy controller outperforms single-mode approaches using either fuzzy logic or Artificial Neural Networks for intelligent clutch actuation control in electro-pneumatic clutch systems for heavy-duty vehicles. The impact on smooth vehicle operation is significant, as evidenced by the improved performance metrics in the electro-pneumatic clutch actuation system.</p>	

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Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.	Yes, The references are suitable and sufficient.	
<u>Minor</u> REVISION comments  Is the language/English quality of the article suitable for scholarly communications?	Yes	
<u>Optional/General</u> comments		

### **PART 2:**

	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)
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

### Reviewer Details:

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