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EHDA closed loop control system based on real time non-visual spray mode classification

(Center, Bold, Times New Roman 14, maximum 15 words in english)

João P. M. Marques[1], **Luewton F. L. Agostinho**[2], **Antonio Carrasco**[3], **Fourth author**[4*]

[1,2] Study Program, Faculty, University Bogor, West Java, 16143, Indonesia
[3] Department of Computer Science, Faculty of Mathematics and Natural Science, Pakuan University, Bogor, West Java, 16143, Indonesia
[4] Department of Mathematical Sciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia

Abstract

We present a closed-loop control system for Electrohydrodynamic Atomization (EHDA) systems that utilizes real-time, non-visual spray mode classification to improve performance, accuracy and efficiency in both research and industrial applications. EHDA is a liquid atomization technique which, by using a high electric field, tiny charged droplets, much smaller than the nozzle diameter, can be generated with a controlled droplet size. The system uses real-time acquired data to classify the spray mode dynamics and adjusts EHDA operation parameters such as liquid flowrate and applied voltage to reach the desired spray mode maintain it stable. The proposed control algorithm is able to achieve improved accuracy and reduced waste compared to previous manual methods. The potential applications of the system are discussed, including industrial processes such as spray coating and gas odorization.

Keywords: *Electrospray; EHDA Control System; EHDA Automation; Electrospray mode classification*

1. Introduction (10pt, bold) –> Do Luewtons Timeline

The introduction is about 400-600 words and provides background information, previous references related to the main topic, reason, purpose of the research, and the novelty of the research. Content should be relatively non-technical, but clear enough for a knowledgeable reader to understand the manuscript's contribution. Explain what the purpose of the research is and why the research was conducted the main body of the article should begin with an introduction, which provides further details on the purpose of the paper, motivation, research methods, and findings. For citations use numbering which must be used for reference titles, for example, citations for journals consisting of 1 article [1] or two articles [2], [3], while for writing citations of more than two articles [4] - [7].

[*]**Corresponding author.** *E-mail address: author4@email.com*
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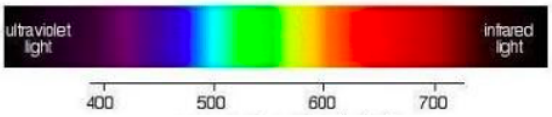
The methods section describes the steps followed in the execution of the study and also provides a brief justification for the research methods used. A chronological explanation of the research, including research design, research procedures (in the form of algorithms, codes, or others), how the procedures are to obtain and test data [8] - [23]. The description of the research has been supported by references, so that the implementation can be accepted scientifically [6]. Figure are presented in the center, as shown below and are cited in the manuscript. An example of a membership function graph can be seen in Figure 1.



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	2019	64	25.9%
	2020	59	23.9%
	2021	70	28.3%
MBKM	Yes	217	87.9%
	No	30	12.1%
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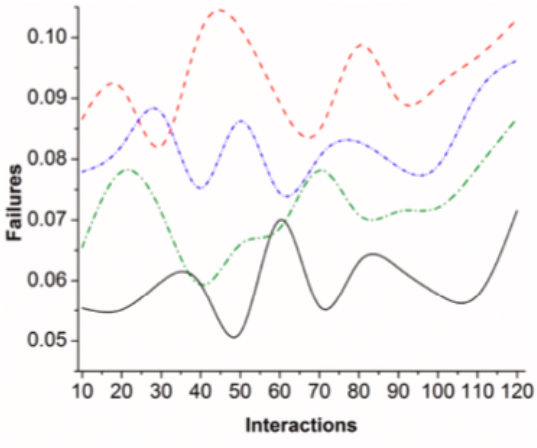

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$$\chi(L(\Gamma);\lambda) = (\lambda+2)^{m-n}\chi(\Gamma;\lambda+2-k) \tag{1}$$

For example, from Eq. 2 it is derived again the next mathematical equation

$$\chi(L(\Gamma);\lambda) = \det(\lambda I_m - A_L) \tag{2}$$

Or there is the next mathematical Eq. 3 as below

$$\det(D_0 D_0^t) = \sum_{|U|=n-1} \det(D_U)\det(D_U^t) \tag{3}$$

3.2. Therema (10pt, bold)

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5. Acknowledgement (if any)

Contains an acknowledgment of thanks to an agency if this research was funded or supported by that agency, or if there were parties who significantly assisted directly in the research or writing of this article. If the party is already listed as the author, then there is no need to mention it again in this Acknowledgment

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