



Download Print Save to PDF Add to List Create bibliography

**AIP Conference Proceedings** • Open Access • Volume 2923, Issue 1 • 28 March 2024 • Article number 020016 • 5th International Conference on Green Chemical Engineering and Technology, GCET 2021 • Simpang Ampat • 15 December 2021 • Code 198507

**Document type**

Conference Paper • Bronze Open Access

**Source type**

Conference Proceedings

**ISSN**

0094243X

**DOI**

10.1063/5.0196499

View more

# Velocity measurement by electrical capacitance tomography: A simulative study

Hamzah, Ahmad Azahari<sup>a</sup> ; Rahim, Ruzairi Abdul<sup>b</sup> ; Sabri, Mohamad Zulkeflee<sup>a</sup> ;

Anuar, Mohd Razealy<sup>a</sup> ; Nasir, Nor Shahirah Mohd<sup>a</sup> ; Mohamad, Elmy Johana<sup>c</sup> ;

Pusppanathan, Jaysuman<sup>b</sup>

Save all to author list

<sup>a</sup> Universiti Kuala Lumpur, Branch Campus Malaysian Institute of Chemical and Bioengineering Technology, Alor Gajah, Melaka, 78000, Malaysia

<sup>b</sup> Faculty of Electrical Engineering, Universiti Teknologi Malaysia, UTM, Skudai, Johor, 81310, Malaysia

<sup>c</sup> Faculty of Electrical and Electronic Engineering, Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor, 86400, Malaysia

Full text options Export

Abstract

Author keywords

SciVal Topics

**Abstract**

Velocity is one of the crucial parameters in the multiphase flow especially gas-solid two-phase flow. Electrical capacitance tomography (ECT) offers robust, inexpensive, non-invasive and non-intrusive techniques for quantifying multiphase flow phenomena. This paper demonstrates a method to estimate average axial velocity through cross-correlation method between dual plane ECT sensors by Parseval's theorem in the frequency domain. In an addition, parabolic fit interpolation was introduced to optimize the time delay calculation. Three cases with different position of PMMA ball in ECT sensor was studied coupled with noise added in the range 5% to 20%. The results show cross-correlation in frequency domain successfully estimates the average axial velocity with 5.5% and reduce to 4% after parabolic fit interpolation treatment. © 2024 Author(s).

**Author keywords**

Cross-correlation; Electrical Capacitance Tomography; Fast Fourier Transform; Parabolic Fit Interpolation; Velocity Measurement

Cited by 0 documents

Inform me when this document is cited in Scopus:

Set citation alert >

**Related documents**

Velocity measurement simulative study of twin plane ECT using advanced cross correlation technique

Ameran, H.L.M. , Mohamad, E.J. , Rahim, R.A. (2015) *ARPN Journal of Engineering and Applied Sciences*

Investigation of gas-solids flow in a circulating fluidized bed using 3D electrical capacitance tomography

Mao, M. , Ye, J. , Wang, H. (2016) *Measurement Science and Technology*

Velocity Profiling of Multiphase Flows Using Capacitive Sensor Sensitivity Gradient

Chowdhury, S. , Marashdeh, Q.M. , Teixeira, F.L. (2016) *IEEE Sensors Journal*

View all related documents based on references

Find more related documents in Scopus based on:

Authors > Keywords >