

# Theoretical Investigation of Liquid Chromatography in Cylindrical Columns



*By*

Farman Ullah Khan

CIIT/FA13-PMT-010/ISB

PhD Thesis

In

Mathematics

COMSATS Institute of Information Technology  
Islamabad-Pakistan

Fall, 2016



**COMSATS Institute of Information Technology**

**Theoretical Investigation of Liquid  
Chromatography in Cylindrical Columns**

A Thesis Presented to

COMSATS Institute of Information Technology, Islamabad

In partial fulfillment  
of the requirement for the degree of

**PhD Mathematics**

By

Farman Ullah Khan  
CIIT/FA13-PMT-010/ISB

Fall, 2016

# Theoretical Investigation of Liquid Chromatography in Cylindrical Columns

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A Post Graduate Thesis submitted to the Department of Mathematics as partial fulfillment of the requirement for the award of Degree of Ph.D in Mathematics.

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## Certificate of Approval

This is to certify that the research work presented in this thesis, entitled " Theoretical Investigation of Liquid Chromatography in Cylindrical Columns" was conducted by Mr. Farman Ullah Khan, CIIT/FA13-PMT-010/ISB, under the supervision of Dr. Shamsul Qamar. No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the Department of Mathematics, COMSATS Institute of Information Technology Islamabad, in the partial fulfillment of the requirement for the degree of Doctor of Philosophy in the field of Mathematics.

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I Farman Ullah Khan, CIIT/FA13-PMT-010/ISB, hereby state that my PhD thesis titled "Theoretical Investigation of Liquid Chromatography in Cylindrical Columns" is my own work and has not been submitted previously by me for taking any degree from this University i.e. COMSATS Institute of Information Technology or anywhere else in the country/world.

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It is certified that Farman Ullah Khan, CIIT/FA13-PMT-010/ISB has carried out all the work related to this thesis under my supervision at the Department of Mathematics, COMSATS Institute of Information Technology, Islamabad and the work fulfills the requirement for award of PhD degree.

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## **DEDICATION**

**This thesis is dedicated to my family and  
friends.**

For their endless love, support and encouragement.



## **ACKNOWLEDGEMENTS**

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