بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / سامية زكى يوسف

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

DEVELOPMENT OF SOFTWARE TO SELECT THE BEST SET OF CORRELATIONS FOR MULTIPHASE FLOW IN PRODUCING WELLS USING SUPPORT VECTOR MACHINE

By

Ahmed Mohamed Hassan Elsayed Abdelrazek

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
PETROLEUM ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Development of Software to Select The Best Set of Correlations for Multiphase Flow in Producing Wells Using Support Vector Machine

Key Words:

Multiphase flow - Multiphase Flow Correlations - Mechanistic Models - Multiphase Flow Correlations Selection - Support Vector Machine

Summary:

Over the years, Many flowing pressure gradient prediction methods were proposed for multiphase flow. They vary in their development nature, based either on empirical correlations or mechanistic modeling. All comparative studies performed showed that none of the methods could generalize for all flow conditions with required accuracy. There are no clear selection guidelines for these methods. The use of actual bottomhole flowing pressure survey is recommended to choose the predictive correlation/model that best suits the well conditions. In absence of this data, the proper selection of the predictive method is crucial. In this work, new selection rules were developed using a novel support vector machine classifier trained on a database with a large diversity of flowing conditions. The implementation of the selection rules reduced the flowing pressure overall average absolute percent prediction error to 7.39% where the best correlation yielded 10.48% over a test data set of 127 wells covering a wide range of well geometries and flow conditions.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Ahmed Mohamed Hassan Elsayed Abdelrazek Date: / /2022

Signature:

Dedication

I wish to dedicate this work to my mother and the rest of my family. Without their support and encouragement, this wouldn’t be achieved.

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