Verse

قال تعالى

(وفوق كل ذى علم عليم)

صدق الله العظيم

سورة يوسف
آية ر قم (76)

Dedication

To my

Wife,

Son,

Parents,

Teachers ,

Brothers and friends .

With gratitude and love .

Acknowledgement

My faithful thanks and praise be to Allah for providing me strength to conduct this research. I would like to express my deep appreciation and sincere gratitude to my supervisor Dr.Ibrahim Hassan Elameen and my Co-supervisor Dr. Gurashi Abdalla Gasmelseed for their valuable guidance and supervision.

.Thanks are also due to my wife and son

Thanks are extended to everyone who assists me to make this study possible.

.Thanks are also due to international research center

Abstract

Experimental data for the equilibrium of the Nile blend crude was determined. The equilibrium data were correlated (using short cut methods) and an equilibrium model was constructed. This model coupled with a multicomponent material balance was used for the determination of the number of theoretical stages, stage .efficiency, and composition and temperature profiles

The work undertaken, lead to a novel design and a mathematical model of the columns that can separate multicomponent systems. Software was developed and might be used for research and development as well as at the stage of starting – up and shut down periods .A case study taking Distillation Column Units(CDU) of Khartoum Refinery was .studied and investigated

Three transfer functions around the condenser, the re boiler and the feed plate were determined. A software of MATLAB 7 was used to analys the system stability , these were . Nyquist diagram , Bode plot and Routh Hurwtz

Composition profile curves ,T-XY diagram as well as the equilibrium curves were determined using ASPEN PLUS software .for multicomponent systems

The transfer function's of the reboiler,condenser,and feed plate were obtained .From the transfer functions created Nyquist diagrams , Bode plots, were converted from Laplace domain to Z .domain, using MATLAB7 Software

X-Y profiles were determined using excel software. Also several variables were obtained for the products of multicompent .systems using ASPEN PLUS Software

Dimensions of the distillation column design were determined such as number of theoretical stages, number of actual stages, feed stage .location and efficiency

.A closed loop control strategy for the system was recommended

ملخص الاطروحة

أعدت بيانات اتزان تجريبية لخام مزيج النيل. بيانات الاتزان تم ربطها وذلك باستخدام الطرق المبسطة وتم بناء نموزج اتزان.النموزج ربط بموازنة مادة متعددة حيث استخدمت فى حساب عدد الصحون النظرية وكفاءة الصينية والتراكيز ودرجات الحرارة الجانبية.

هذا العمل يقود الى طريقة فى بناء نموزج رياضى لعمود يمكن استخدامه لفصل نظام متعدد.

قمنا باستخدام برامج فى هذا البحث من مرحلة البداية الى مرحلة الصيانة ، حيث كانت دراسة الحالة لبرج التقطير المتعدد لمصفاة الخرطوم.

قمنا باعداد ثلاثة دوال انتقال حول المكثف،الغلاية وصينية التغذية و قمنا برسم مخطط نيكوست ومخطط بودى والتحويل من مجال لابلاس الى Z مجال وذلك باستخدام برنامج ماتلاب 7 .

قمنا برسم مخطط للعلاقة بين تركيزالسائل والبخاروذلك باستخدام برنامج اكسل.وكذلك قمنا بحسابات لمتغيرات عديدة لمنتجات التقطير المتعدد وذلك باستخدام برنامج اسبن بلس.

ابعاد تصميم برج التقطير تم حسابها تمثلت فى عدد الصوانى النظرية والصوانى الحقيقية وصينية التغذية والكفاءة.
نوصى بنظام تحكم مغلق.

Table of Contents

List of Tables

List of Figures