DEVELOPING AN OPTIMIZATION-SIMULATION TOOL USING GLOBAL OPTIMIZATION TECHNIQUES TO OPTIMIZE OPERATING CONDITIONS OF LARGE-SCALE PLANT

By

Salah Hamdy Mohamed Bayoumy

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
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in
Chemical Engineering

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Title of Thesis:

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Key Words:
Stochastic Optimization Techniques; HYSYS Automation; MATLAB-HYSYS Linkage; Sensitivity Analysis Studies; Saturated Gas Plant.

Summary:
This research work introduces a feasible optimization-simulation tool for optimization of continuous variables to the whole plant that includes fractionation section with multi-component feeds, pumps, heat exchangers and compressors rather than quite a few individual units (not complete plants) that was studied before. The goal of this research work is to establish firstly a steady state model for a new saturated gas plant that exists in a certain oil refinery plant to be compatible with two different modes (design mode and future mode) to produce LPG and Stabilized Naphtha. The chief goal of the present work is to introduce lastly an interface which facilitates the interaction between Aspen HYSYS ® and MATLAB® for evolving an optimization-simulation tool which can stand on the optimum operating conditions. Sensitivity analysis study should be accomplished before and after optimization on the steady state model to enhance adequacy of the results in terms of maximum C4 recovery and minimum total annual cost.

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Table of Contents

ACKNOWLEDGMENTS ..... **V**

TABLE OF CONTENTS ..... **VI**

LIST OF TABLES ..... **IX**

LIST OF FIGURES ..... **X**

NOMENCLATURE ..... **XI**

ABSTRACT ..... **XIII**

CHAPTER 1 INTRODUCTION **1**

CHAPTER 2 LITERATURE SURVEY **3**

2.1. INTRODUCTION 3
2.2. REFINERY BACKGROUND 3
2.3. LIGHT-END PROCESSING UNITS IN REFINERY PLANTS 6
2.3.1. Saturated Gas Plant 7
2.3.2. Un-saturated Gas Plant 9
2.4. SOFTWARE PACKAGES 10
2.4.1. Aspen Tech HYSYS Simulation Package V8.6 ® 10
2.4.2. MATLAB ® 10
2.4.3. HYSYS Automation 10
2.5. OPTIMIZATION-SIMULATION FRAMEWORKS 11

CHAPTER 3 STATEMENT OF THE PROBLEM **14**

CHAPTER 4 GENERAL METHODOLOGY **15**

4.1. PROBLEM FORMULATION 15
4.1.1. Process Model 15
4.1.2. Objective Function 16
4.2. SENSITIVITY ANALYSIS 17
4.3. OPTIMIZATION ALGORITHMS 17
4.3.1. Derivative-based Algorithms 17
4.3.2. Stochastic Optimization Techniques 19
4.3.2.1. Simulation Model Coupled with GA Algorithm 20
4.3.2.2. Simulation Model Coupled with PSO Algorithm 21
4.4. MATLAB-HYSYS LINKAGE'S PROBLEMS 21

CHAPTER 5 SIMULATION PROBLEM: A CASE STUDY **23**

5.1. INTRODUCTION 23
5.2. PROCESS DESCRIPTION 23
5.3. PROCESS DESIGN BASIS 27
5.3.1. Fluid Package 27
5.3.2. Feed Characterization 27
5.3.2.1. Feeds Composition 27

5.3.2.2. Pseudo-Components Properties 38
5.3.2.3. Design Feed Flow Rates 39
5.3.2.4. Feed Conditions 40
5.3.3. Sponge Oil Characterization 40
5.3.4. Product Specifications 42
5.3.5. Assumptions List 42

CHAPTER 6 SIMULATION METHODOLOGY 43

6.1. INTRODUCTION 43
6.2. MAIN PROCESSING UNITS 43
6.2.1. Pre-treatment Facilities 43
6.2.1.1. Compression Station Package 44
6.2.1.2. Naphtha Receiving Three Phase Separator 44
6.2.2. Fractionation Train 44
6.2.2.1. Deethanizer Tower 45
6.2.2.2. Debutanizer Tower 46
6.2.2.3. Sponge Absorber Tower 46
6.2.2.4. Thermal Task Integration 47
6.2.2.4.1. Deethanizer Reboiler 47
6.2.2.4.2. Liquid / Liquid Exchanger 48
6.3. SENSITIVITY ANALYSIS ON HYSYS MODEL 48
6.3.1. The Implicit-Constraints of Local and Global Optimization 49
6.3.2. *New Fractionation Area Local Optimization* 49
6.3.3. Optimum Operating Pressure Selection Criteria 49
6.3.4. Number of Stages Selection Criteria 50

CHAPTER 7 GLOBAL OPTIMIZATION-SIMULATION METHODOLOGY .. 51

7.1. INTRODUCTION 51
7.2. OBJECTIVE FUNCTION 51
7.2.1. Capital Cost 52
7.2.1.1. Capital Cost for Heat Exchangers 52
7.2.1.2. Capital Cost for Distillation Towers 53
7.2.2. Operating Cost 53
7.3. HYSYS MODEL COUPLED WITH GA ALGORITHM 55
7.4. HYSYS MODEL COUPLED WITH PSO ALGORITHM 56

CHAPTER 8 RESULTS AND DISCUSSION 58

8.1. INTRODUCTION 58
8.2. SENSITIVITY ANALYSIS STUDY OUTCOMES AND DISCUSSION 58
8.2.1. The Optimum Number of Stages for Debutanizer 58
8.2.2. The Optimum Number of Stages for Deethanizer 59
8.2.3. Impact of Lean Oil Recycled Amount on Base and Future Model 60
8.2.4. Constrained Bounds for Base Case Model 66
8.2.5. Constrained Bounds for Future Mode Model 66
8.3. OPTIMIZATION-SIMULATION KEY FINDINGS AND DISCUSSION 67
8.3.1. Key Findings from Using GA 67
8.3.1.1. GA's Results Validation 68
8.3.2. Key Findings from Using PSO 68
8.3.2.1. PSO's Results Validation 73

8.3.3. Validation of The Produced Optimum Operating Conditions by Comparison between The Produced Results from Both GA and PSO 74
8.3.4. Internal Temperature Profile along The Distillation Towers 75
CHAPTER 9 CONCLUSIONS AND RECOMMENDATIONS 76
9.1. CONCLUSIONS 76
9.2. RECOMMENDATIONS 77
REFERENCES 78
APPENDIX A HYSYS-MATLAB INTERFACE CODE 81
APPENDIX B INTERNAL TEMPERATURE PROFILES 86
APPENDIX C OVERALL HYSYS GUI 88

List of Tables

Table 5.1: Vapor feed composition from CDU (1) in mole %.....28
Table 5.2: Vapor feed composition from CDU (2) in mole %.....30
Table 5.3: Light naphtha composition from CDU (1) in wt% 31
Table 5.4: Light naphtha composition from CDU (2) in wt%. 34
Table 5.5: NHT sour off-gas composition in mole % (Shukair) 37
Table 5.6: Isomerization off gas composition in mole % (Shukair).....37
Table 5.7: CCR off spec LPG composition in wt. % (Shukair) 37
Table 5.8: CCR off gas composition in wt. % (Shukair).....38
Table 5.9: Hypo-components properties 38
Table 5.10: Design feed flow rates.....39
Table 5.11: Operating conditions of feed streams.....40
Table 5.12: Sponge oil ASTM D-86 distillation curve 41
Table 5.13: Light-end analysis 41
Table 5.14: Sponge oil tie-in conditions.....41
Table 5.15: Product specifications 42
Table 8.1: Effect of split ratio for the lean oil for the base case. Deethanizer theoretical stages = 25; Debutanizer stages =10. 61
Table 8.2: Effect of split ratio for the lean oil for the future mode. Deethanizer theoretical stages = 25; Debutanizer stages =10. 63
Table 8.3: Constrained bounds for design variables for base case.....66
Table 8.4: Constrained bounds for design variables for future mode 66
Table 8.5: Computational outputs from GA for the base case 67
Table 8.6: Computational outputs from GA for the future mode.....68
Table 8.7: Computational outputs from PSO for the base case (first interval) 69
Table 8.8: Computational outputs from PSO for the base case (second interval).....70
Table 8.9: Computational outputs from PSO for the future mode (first interval).....71
Table 8.10: Computational outputs from PSO for the future mode (second interval) ...72
Table 8.11: Computational outputs from PSO for the future mode (third interval).....73
Table 8.12: Optimum operating conditions in the base case and the future mode by using GA.....74
Table 8.13: Optimum operating conditions in the base case and the future mode by using PSO 74

List of Figures

Figure 2.1: Topping refinery model configuration....4
Figure 2.2: Hydro-skimming refinery model configuration....5
Figure 2.3: General scheme of complex refinery plant....6
Figure 2.4: Chemical structure for some paraffinic compounds....6
Figure 2.5: Chemical structure for some olefin compounds....7
Figure 2.6: Absorption-fractionation SGP in shape of standalone columns....8
Figure 2.7: Absorption-fractionation saturated gas plant in shape of one column....9
Figure 2.8: Un-saturated gas plant (catalytic cracker gas plant) block flow diagram....9
Figure 2.9: A typical process module with the necessary interconnections....11
Figure 4.1: Mechanism of extracting information from HYSYS....18
Figure 4.2: The numerical noise in the transferred data at the same design variables....18
Figure 4.3: The numerical noise in the derivatives the same design variables....19
Figure 5.1: Simple schematic block flow diagram for the base case....24
Figure 5.2: Simple schematic block flow diagram for the future mode....26
Figure 6.1: Compression package and naphtha receiving three phase separator....44
Figure 6.2: Configuration of Deethanizer tower....45
Figure 6.3: Configuration of Debutanizer tower....46
Figure 6.4: Configuration of sponge oil absorber....47
Figure 6.5: Deethanizer reboiler....48
Figure 6.6: Run down feed pre-heater....48
Figure 7.1 Logical flowchart for the GA proposed algorithm....56
Figure 7.2: Logical flowchart for the PSO proposed algorithm....57
Figure 8.1: Optimization for number of stages of Debutanizer....58
Figure 8.2: Feed stage location optimization at split ratio=0.5....59
Figure 8.3: Optimization for number of stages of Deethanizer....60
Figure 8.4: Impact of lean oil recycle amount on operating bottom pressure of Deethanizer in each of future mode and base case....64
Figure 8.5: Impact of lean oil recycle amount on operating bottom temperature of Deethanizer in each of future mode and base case....65
Figure B.1: Internal temperature profile of Deethanizer in the base case....86
Figure B.2: Internal temperature profile of Deethanizer in the future mode....86
Figure B.3: Internal temperature profile of Debutanizer in the base case....87
Figure B.4: Internal temperature profile of Deethanizer in the future mode....87
Figure C.1: HYSYS GUI for base case....88
Figure C.2: HYSYS GUI for future mode....89