

بسم الله الرحمن الرحيم



HOSSAM MAGHRABY



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



HOSSAM MAGHRABY

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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HOSSAM MAGHRABY



INTEGRATED PLANNING OF AIRCRAFT ROUTING AND CREW SCHEDULING

By

Ibrahim Abdelrazzak Aref Deeb

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
Aerospace Engineering

**FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Integrated planning of aircraft routing and crew scheduling

Key Words:

Airplane routing; crew Scheduling; Bender Decomposition; Branch and Bound; Linear programming

Summary:

The solution process iterates between a master problem that solves the aircraft routing problem, and a sub-problem that solves the crew pairing problem. This technique reduces computing time and eases the linkage procedure between the two problems and at first achieving sub-optimal non-integer results and then a branch and bound algorithm is performed to get the optimal integer solutions.

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: Ibrahim Abdelrazzak Aref Deeb

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Table of Contents

DISCLAIMER.....	I
ACKNOWLEDGMENTS	II
TABLE OF CONTENTS.....	III
NOMENCLATURE AND LIST OF ABBREVIATIONS.....	I
LIST OF TABLES	II
LIST OF FIGURES	IV
ABSTRACT.....	V
CHAPTER 1 : INTRODUCTION.....	1
CHAPTER 2 : LITERATURE REVIEW.....	3
2.1. AIRLINE SCHEDULING	3
2.2. AIRCRAFT ROUTING	4
2.2.1. Network Structure	4
2.2.2. Models and Algorithms.....	7
2.3. CREW SCHEDULING	9
2.3.1. Basic structure.....	9
2.3.2. Solving Crew Scheduling Problems.....	10
2.3.3. Impacts and Challenges.....	11
2.4. INTEGRATED PROBLEMS.....	12
2.4.1. Aircraft Maintenance Routing Problem with Fleet Assignment Problem.....	12
2.4.2. Aircraft Maintenance Routing with Crew Pairing Problem.....	12
2.4.3. Fleet assignment with Crew Pairing Problem	14
CHAPTER 3 : INTEGRATED MODEL.....	15
3.1. MATHEMATICAL MODEL	15
3.2. AIRCRAFT ROUTING SCENARIOS GENERATION	19
3.2.1. One-day route generation.....	20
3.2.1.1. Input data for aircraft routing generation.....	20
3.2.1.2. One-day route building criteria	21
3.2.1.3. Procedure for generating one-day route	21
3.2.1.4. Results for generating one-day route.....	25
3.2.3. Two-days route generation.....	27
3.2.3.1. Two-day routing building criteria	27
3.2.3.2. Two-day route generation procedure.....	27
3.3. AIRCRAFT ROUTING SIDE CONSTRAINTS	30
3.3.1. Flight coverage matrix	30
3.3.2. Number of aircraft limitation	31
3.4. COST VECTOR FOR AIRCRAFT ROUTING.....	32
3.4.1. Cost function for the aircraft route	32
3.4.2. Calculation of maintenance opportunities parameter.....	33
3.4.3. Calculation of connection time parameter.....	33
3.4.4. Calculation of through values parameter.....	34

3.4.5.	Total route cost.....	35
3.5.	CREW PAIRING SCENARIOS GENERATION.....	36
3.5.1.	One-day duty generation	36
3.5.1.1.	Some definitions.....	36
3.5.1.2.	Input data for crew pairing generation	37
3.5.1.3.	Duty building criteria	37
3.5.2.	Procedure for generating one-day duty	38
3.5.2.1.	Two-flights per day duty generation	38
3.5.2.2.	Three-flights per day duty generation	40
3.5.3.	Results for generating one-day duty.....	41
3.5.4.	Two-days pair generation.....	42
3.5.4.1.	Two-days pair building criteria	42
3.5.4.2.	Two-days pair generation procedure	42
3.6.	CREW PAIRING SIDE CONSTRAINTS	45
3.6.1.	Main Concept	45
3.6.2.	Flight coverage matrix	47
3.6.3.	Number of crew limitation	47
3.7.	COST VECTOR FOR CREW PAIRS	48
3.7.1.	Duty cost	48
3.7.2.	Pair cost	50
3.7.3.	Extra costs	53
CHAPTER 4	BENDER DECOMPOSITION SOLUTION	55
4.1.	BINDING CONSTRAINT	55
4.1.1.	Definition of a binding constraint	55
4.1.2.	Short connection definition and examples	56
4.1.3.	Short connection searching criteria	58
4.1.4.	Procedure for generating short connections	58
4.1.5.	Short connection presence matrices	59
4.2.	OVERVIEW ON INTEGER PROGRAMMING	61
4.3.	PROBLEM SET UP USING BENDER DECOMPOSITION	62
4.3.1.	Primal sub problem	64
4.3.2.	Dual sub-problem.....	66
4.3.3.	Master problem	75
4.4.	SOLUTION METHODOLOGY	77
4.4.1.	Relaxed problem algorithm	77
4.4.2.	Relaxed problem numerical solution.....	78
4.4.3.	Integer solution approach.....	82
4.4.4.	Integer numerical solution.....	82
CHAPTER 5	: RESULTS & DISCUSSION.....	86
5.1.	OPTIMAL AIRCRAFT ROUTES SOLUTION	86
5.1.1.	Arrival and departure	87
5.1.3.	Cost details	93
5.3.	OPTIMAL CREW PAIRS SOLUTION	95
5.3.2.	Arrival and departure	96
5.3.4.	Cost details	103
5.4.	SUBOPTIMAL SOLUTIONS	104
5.4.1.	Greater no. of aircraft solution	104

5.4.2.	Greater no. of crew members solutions.....	106
5.4.4.	Higher crew cost solutions	108
5.4.5.	Independent crew pairing solution	110
CHAPTER 6 : CONCLUSION & FUTURE WORK.....		112
6.1.	CONCLUSION	112
6.2.	FUTURE WORK.....	113
REFERENCES.....		114

Nomenclature and List of Abbreviations

Nomenclature

a_{ij}^d	Route Scenario Flight Coverage Matrix Element
a_{ik}	Pair Scenario Flight Coverage Matrix Element
b_{wj}^d	Route Scenario Short Connection Presence Matrix Element
b_{wk}	Pair Scenario Short Connection Presence Matrix Element
c_j	Cost of Route “j”
c_k	Cost of Pair “k”
d	Day Index
D	Total number of days
F	Flight Index
i	Total number of flights
j	Route Index
k	Pair Index
M	Total number of crews
N	Total number of aircraft in the fleet
P	Set of Feasible Pairs
R	Set of Feasible Routes
S	Set of Short Connections
u	Dual variable for Primal Sub-problem
w	Short Connection Index
x_j	Decision Variable for Route Scenario “j”
y_k	Decision Variable for Pair Scenario “k”
Z_o	Objective Function Value for Primal Sub-problem
Z_m	Objective Function Value for Master problem

List of Tables

Table 3.1 : Flight Schedule	20
Table 3.2 : Flight "101" two flight sequence	22
Table 3.3 : Flight "102" two flight sequence	23
Table 3.4 : Two flights per day sequences	23
Table 3.5 : Three flights per day route	25
Table 3.6 : One day route sample results	25
Table 3.7 : Two day valid routes	29
Table 3.8 : Flight coverage example	30
Table 3.9 : Route connection time calculation	34
Table 3.10 : Route demand calculation	35
Table 3.11 : Flight "101" two flight sequence	38
Table 3.12 : Flight "102" two flight sequence	39
Table 3.13 : Two flights per day duty scenarios	39
Table 3.14 : Three flights per day duty scenarios	40
Table 3.15 : One duty flight sequence sample	41
Table 3.16 : Duty scenarios example	42
Table 3.17 : Two day pair sample results	44
Table 3.18 : Crew set 1 coverage	45
Table 3.19 : Crew set #2 coverage	46
Table 3.20 : Flight coverage example	46
Table 3.21 : Duty 1 cost calculation	49
Table 3.22 : Duty 2 cost calculation	50
Table 3.23 : Pair calculation	52
Table 3.24 : Extra cost calculation	54
Table 4.25 : Short connections	59
Table 4.26 : Conversions to standard form for linear programming models	67
Table 4.27 : Corresponding primal-dual forms	68
Table 4.28 : Relationships between complementary solutions	69
Table 4.29 : Relaxed Master problem results for iteration #1	78
Table 4.30 : Relaxed dual problem results for iteration #1	79
Table 4.31 : Relaxed Master problem results for iteration #2	80
Table 4.32 : Relaxed dual problem results for iteration #2	81
Table 4.33 : Integer Master Problem results for iteration #1	83
Table 4.34 : Relaxed dual problem results for iteration #1	84
Table 4.35 : Integer primal problem results	85
Table 5.36 : Optimal aircraft routes	86
Table 5.37 : Day 1 route stations	87
Table 5.38 : Day 2 routes stations	88
Table 5.39 : Day 1 routes timings	89
Table 5.40 : Day 2 routes timings	90
Table 5.41 : Routes maintenance opportunity	91
Table 5.42 : Maintenance durations	92
Table 5.43 : Routes cost factors	93
Table 5.44 : Routes cost values	94
Table 5.45 : Optimal crew pairs	95
Table 5.46 : Day 1 pairs stations	96
Table 5.47 : Day 2 pairs stations	97

Table 5.48 : Day 1 pairs timings	98
Table 5.49 : Day 2 pairs timings	99
Table 5.50 : Pairs maximum flying hours	100
Table 5.51 : Crew pairs layovers.....	101
Table 5.52 : Cycle pairs	102
Table 5.53 : Pairs cost	103
Table 5.54 : Greater no. of aircraft routes	104
Table 5.55 : Greater no. of crew pairs.....	106
Table 5.56 : Higher crew pairs cost	108
Table 5.57 : Independent crew pairs solution	110