

Simulation/Optimization in Cash Logistics Management

INTRODUCTION

Feedback on progress

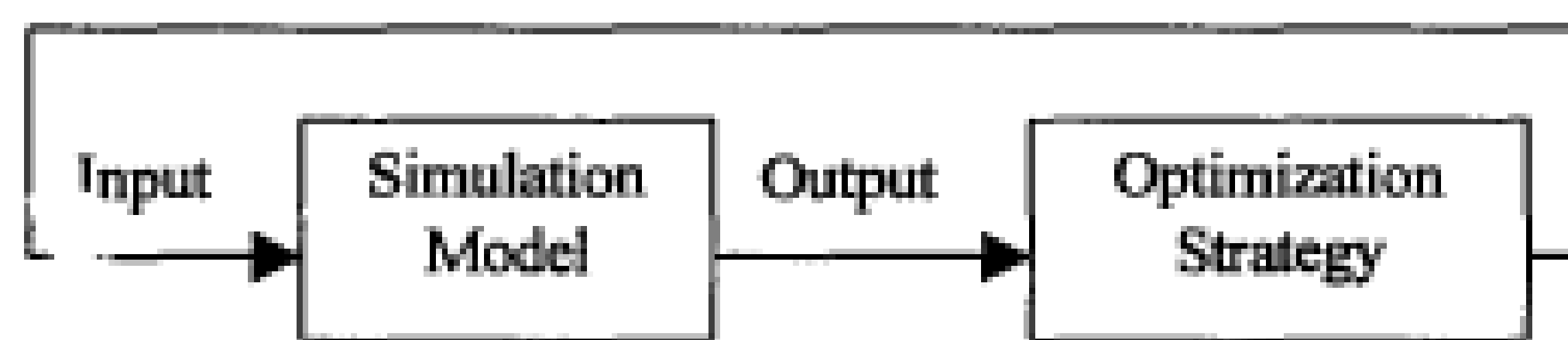


Figure 2: A Simulation Optimization Model

(Carson, Maria, 1997)

Simulation Optimization

Finding the best possible set of decision variables without checking each different strategy

An area that has drawn the attention of research communities

Applications for inventory systems

Cash logistics management problem

ATM's are Inventories

Costs of logistics and cost of cash

A simulation model is designed

Optimization of multiple variables

OBJECTIVES

Determining model specifications

Optimal amount of cash

Reduced Costs

PROBLEM SPECIFICATION

t	Service Day	Withdraw	Deposit	FLM's	Replenishment	Load	Withdraw Reset	Deposit Reset	Withdraw Cycle	Deposit Cycle
0									173160	186420
1	1	56740	137260		0	0	0	0	116420	323680
2	1	52020	47500	15:42 UNPLANNED FLM (1)	0	0	0	323680	64400	47500
3	1	58420	82120	08:51 PLANNED FLM (2)	0	0	0	47500	5980	82120
4	1	70690	141965		1	100000	5980	82120	29310	141965
5	1	81180	36360	11:51 UNPLANNED FLM (3)	1	360000	29310	141965	278820	36360
6	0	70040	34145	11:20 PLANNED FLM (4)	0	0	0	36360	208780	34145
7	0	42550	65190		0	0	0	0	166230	99335
8	1	51940	101515		0	0	0	99335	114290	101515
9	1	66570	61340		0	0	0	0	47720	162855
10	1	83870	107415	09:31 PLANNED FLM (5)	1	100000	47720	162855	16130	107415
11	1	97010	99035		1	100000	16130	0	2990	206450
12	1	90880	119210		1	360000	2990	206450	269120	119210
13	0	122070	40990	09:38 UNPLANNED FLM (7)	0	0	0	119210	147050	40990
14	0	65720	48360	09:55 UNPLANNED FLM (8)	0	0	0	40990	81330	48360
15	1	81380	122335	16:23 UNPLANNED FLM (9)	1	100000	81330	48360	18620	122335

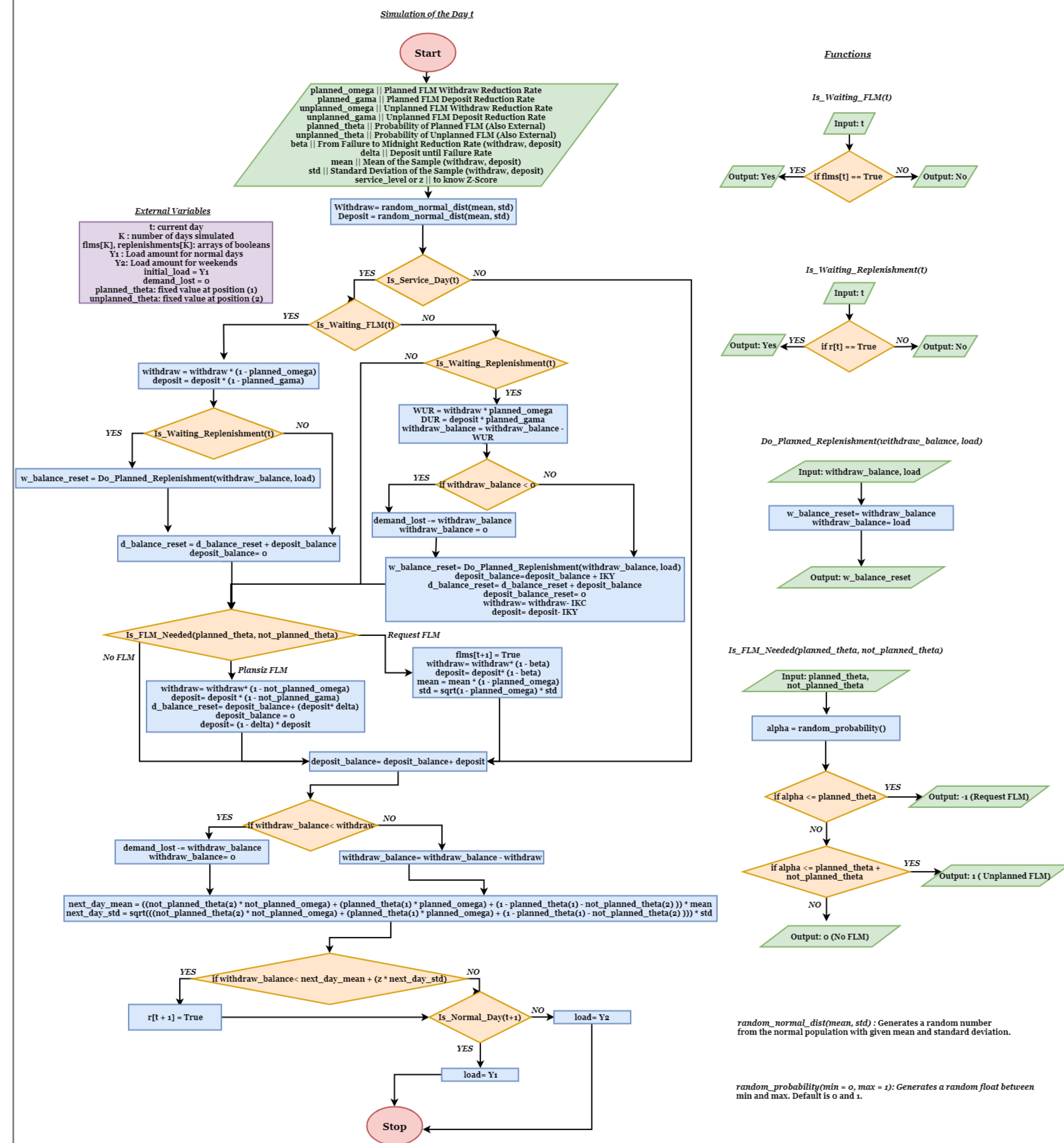
Upper bound for the deposit balance

Lower bound for the withdraw balance

How much money to load ?

Expected to minimize the total cost

SIMULATION MODEL



Taking balances from previous day

Determining reduction parameters

Generating withdraw and deposit demands

First Line Maintenance and replenishment

Demand realization and deciding requests

CONCLUSIONS

Attractive method

Handles complex problems

Improvements on costs

Open to further research

REFERENCES

