REAL-TIME CONTROL OF STORMWATER NETWORKS

A PREPRINT

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1 Introduction

1.1 Previous Work

2 Model

Symbol	Description
$\mathbb{T}$	Planning Horizon
V_i^t	Volume in i^{th} node at time t
δ_{ji}	Travel time from node j to i
c_i	Maximum capacity in node i
x_{ij}^t	Flow in arc ij at time t
u_{ij}	Maximum capacity in arc ij
q_i^t	Inflow to i^{th} node at time t

Table 1: Summary of notation used in the paper.

2.1 Centralized Control

$$\underset{x_{ij}}{\text{minimize}} \quad \sum_{t}^{\mathbb{T}} \sum_{i}^{N} w_i V_i^t \tag{1a}$$

$$\text{subject to} \quad 0 \leq V_i^t \leq c_i \quad (i \in N, t \in \mathbb{T}), \tag{1b}$$

$$0 \leq x_{ij}^t \leq u_{ij} \quad (ij \in A, t \in \mathbb{T}), \tag{1c}$$

$$x_{ij}^t \leq f(V_i^{t-1}) \quad (i \in A, ij \in A, t \in \mathbb{T}), \tag{1d}$$

$$V_i^t = V_i^{t-1} + q_i^t + \sum_{j \in N} x_{ji}^{t-\delta_{ji}} - \sum_{j \in N} x_{ij}^t \quad (i \in N, t \in \mathbb{T}) \tag{1e}$$

2.2 Distributed Control

3 Results

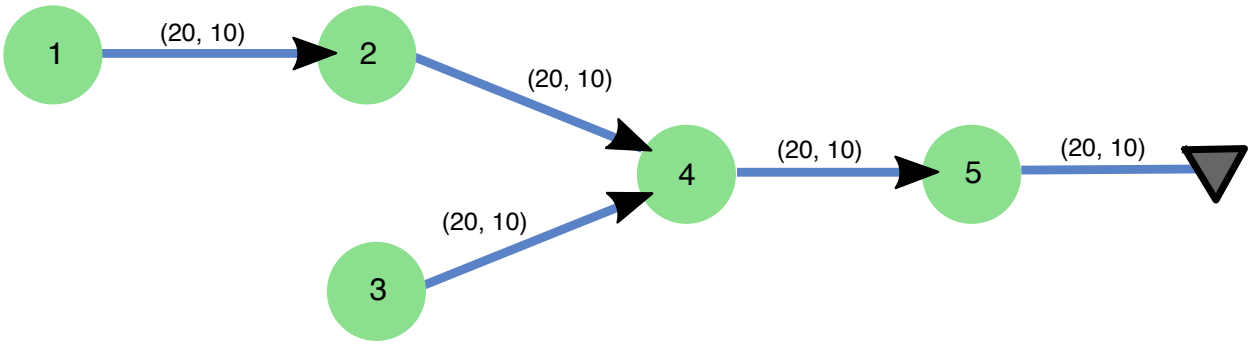

Figure 1: Network of 5 nodes being used to evaluate the performance of both problem formulations.

4 Appendix

References