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

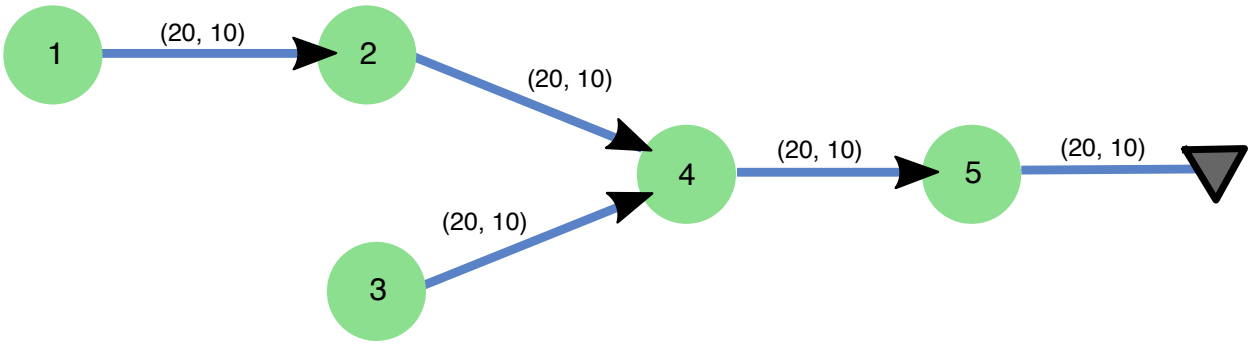

Figure 1: Network of 5 nodes being used to evaluate the performance of both problem formulations.

Both the problem formulations are evaluated in the same network to compare the performance of system.

3.1 Centralized Control

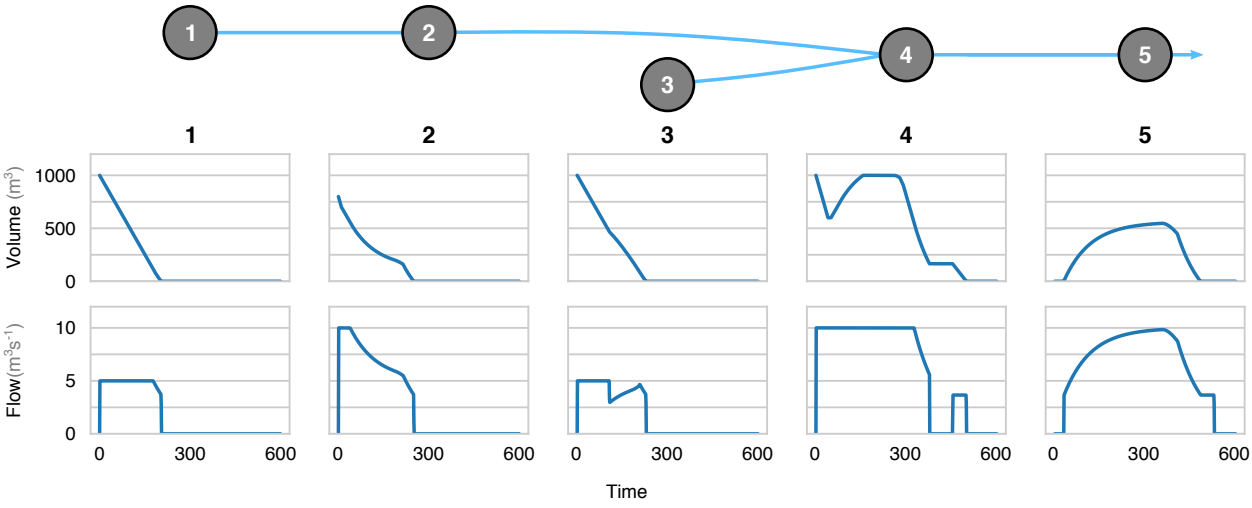

Figure 2: Network of 5 nodes being used to evaluate the performance of both problem formulations.

4 Appendix

References