

# Review of Paper on Networked Control for Water Distribution

Wednesday, 30th of November 2016

## Overall Assessment

Very nice paper to read. Understandable and good flow of information.

There are a lot of grammatical errors, which needs to be looked into.

## General Comments

- Maybe the abstract should also contain the conclusion of the project, to give a full first impression of the project.
- There are different ways of implementing equations in the flow of the paper. However, we think that including the equations as part of the sentences provides a good flow. In this case, proper grammatical punctuation should be used around equations.

The attitude model equations, which are based on Newton's  
Second Law for rotational movement, are as follows

$$J_x \ddot{\phi} = k_{th}(\omega_4^2 - \omega_2^2)L \quad (3)$$

$$J_y \ddot{\theta} = k_{th}(\omega_1^2 - \omega_3^2)L \quad (4)$$

$$J_z \ddot{\psi} = k_d(\omega_1^2 - \omega_2^2 + \omega_3^2 - \omega_4^2) \quad (5)$$

where  $J_x$ ,  $J_y$  and  $J_z$  are the moments of inertia around the  
three axes of rotation,  $\ddot{\phi}$ ,  $\ddot{\theta}$  and  $\ddot{\psi}$  are the accelerations in roll,

Either way, we suggest to select one way and then stick to it as much as possible. Right now you change between using a colon and not using a colon.

- Using "below" and "above" for figure and equation references can be confusing in a paper where the layout is in columns, we think that the figure reference itself is sufficient.

## Specific Comments

- The headline, we suggest, should be written as: Networked Control for Water Distribution.
- Abstract - 1st column - 1st paragraph - "Water Distribution networks are play a key infrastructure role for cities and industrial areas around the world."  
Suggestion: "Around the world water distribution networks have a key role for cities and industrial areas infrastructure."
- Abstract - 1st column - 1st paragraph - "The nature of water distribution networks means the actuators, sensors and control systems are geographically separated [...]"  
Suggestion: "in general water distribution networks have actuators, sensors and control systems geographically separated [...]"
- Section I - 1st column - 2nd paragraph - "[...] distribution networks (WDN) so all consumers [...]"  
Suggestion: "[...] distribution networks (WDN) to ensure all consumers [...]"

- Section I - 1st column - 2nd paragraph - "Addition of users in a network [...]".  
Suggestion: "In addition to the number of users in a network [...]".
- Section I - 1st column - 2nd paragraph - "[...] in whole distribution network [...]".  
Suggestion: "[...] in the whole distribution network. [...]".
- Section I - 1st column - 2nd paragraph - "[...] according to consumer's need and components available in that network [...]".  
Suggestion: "[...] according to consumer's needs and the components available in the specific network [...]".
- Section I - 1st column - 2nd paragraph - "[...] desired operating pressure point via [...]".  
Suggestion: "[...]desired pressure operating point by utilizing [...]".
- Section I - 1st column - 2nd paragraph - "The water distribution network has nonlinear characteristics [3]".  
Suggestion: This sentence is slightly out of context, maybe including it in the Section II description underneath (3rd paragraph in section I), as a reason to linearize, would be better.
- Section I - 1st column - 3rd paragraph: " [...] and state space model is derived from linearized model [...]".  
Suggestion: "[...] and "a" state space model is derived from "a" linearized model [...]".
- Section I - 1st and 2nd column - 3rd paragraph: "In section III [...]".  
Suggestion: This should be on the same line and column.
- Section II A 1 - 2nd column - paragraph 2: "Includes the surface resistance and from resistance".  
Thoughts: What is this "from resistance"?
- Thoughts on Section II A 1 - 2nd column - equation (1)  
Note: It is hard to see that it is an absolute value of  $q_k$ .  
Suggestions: separate the three variables by dots.
- Section II A 2 - 1st column - 3rd paragraph - "[...]in m<sup>3</sup>/h [...]".  
Suggestion: "[...] in [m<sup>3</sup>/h][...]".
- Section II C - 2nd column - 2nd paragraph - Figure 1  
Suggestion: Nice figure, maybe the three components can be in a row to take up less space.
- Section II C - 2nd column - 4th paragraph - "[...] component in the network and the components are in reference to Figure 1."

Suggestion: "[...] component in the network."

- Section II C - 1st and 2nd column - 4th paragraph - Figure 4

Thoughts: The figure is really nice. However it is quite small; maybe it could take up an entire page, if there is enough room for it.

- Section II C - 1st and 2nd column - 4th paragraph - Figure 4 - Figure text: "Test Water Distribution Network Diagram".

Suggestion: "Diagram of the water distribution network test setup."

- Section II C - 1st column - 6th paragraph - "[...] for the pipe, valve from [...]"

Suggestion: "[...] for the pipe and valve from [...]"

- Section II C - 1st column - 6th paragraph - "[...] are shown below. [enter] Thus, in matrix form, [...]"

Thoughts: You write like there are loop equations below (which there aren't). Then you use the non-existent equations in a state space model.

- Section III - 1st column - 3th paragraph - Figure 5: The label and title should be bigger. Furthermore a legend should be included.

- Section - 1st column - 4th paragraph - "Figure 5. above, the system's output [...]"

Suggestion: "In Fig. 5, the system's output [...]"

Thought: As it is referred to Fig. 5 in the figure, therefore it should be Fig. 5 in the text as well.

- Section IV - 1st column - 1st paragraph: "This introduced the delays from sensors to controlling part and also from controlling parts to actuators."

Suggestion: "This introduces delays from sensors to controllers and from controllers to actuators."

- Section IV - 1st column - 1st paragraph: "[...] delay is occurred in system by controllers, actuators and network controlling part exchanging data."

Suggestion: "[...] delay occurs when the different components of the system, the controller, actuators and sensors, are exchanging data."

Thoughts: Maybe we do not understand it correctly, in which case it should be written more clearly.

- Section IV - 1st column - 1st paragraph: "[...] compared to other."

Thoughts: Other?