**Review Report**

**Paper Title: Algorithm for Optimization of Branching Gravity-Distribution Networks**

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Several algorithms are available in literature for optimal design of branched gravity-fed WDNs. Authors have chosen two out of them, a back tracking (BT) algorithm and a genetic algorithm (GA) without giving any proper justification of their selection. The chosen algorithms have been compared with a new calculus-based algorithm. I would like to suggest authors to provide advantage of proposed CB with those available in literature (Deb 1974, Bhave 1978, Chiplunkar and Khanna 1983, Fujiwara and Dey 1988, Young 1994, Johnson et al. 1996). Bhave's (1978) approach is general and applicable to branched as well as looped networks, gravity as well as pumped source networks, and new as well as existing networks. In case of looped networks, primary pipes forming a branching configuration is identified and designed to carry maximum flows by considering secondary loop-forming links of some minimum size.

Using calculus based approach, Bhave (1978) developed an optimal criterion similar to Eq. (9) of authors and expressed as

$$-\sum\left(\frac{bC}{h}\right)_{ij}+\sum\left(\frac{bC}{h}\right)_{jk}=0$$

Where ij and jk are supply and distribution links at any node j; C and h are cost and head loss in any pipe.

Bhave (1978) suggested a univariant method in which nodal heads are assumed initially and corrected iteratively in order to satisfy the optimal criteria at all nodes. Gupta et al. (2003) improved the method of solution adopting Newton-Raphson method in which all correction values are obtained simultaneously for faster convergence of iterative methodology.

The equation (18) of author seems to be similar to Bhave's optimality criterion, if minor losses are ignored. Authors are requested to clearly point out the difference with Bhave's optimality criteria. Also, a systematic procedure or flow chart should be included to apply the proposed methodology to design water networks.

Even though outcome of the paper is general and nothing new in it, the paper can be recommended if the difference between the proposed CB method with Bhave's CB method is clearly indicated and proposed methodology is explained by giving procedure or flowchart.

**Additional References**

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