عنوان مقاله:

Probabilistic Modeling and Estimation of Flow Rate of Sewage Treatment Plant Using Monte Carlo Hybrid Method

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خلاصه مقاله:

One of the most important results of hydraulic and hydrological modeling of the urban drainage network is hydrograph estimation. Annual journals on hydraulic and hydrological problems, especially in developing countries, are full of missing data, discrete and continuous gaps in most hydrological data, such as inlet flow and other series of flow data. This is due to reasons such as not registering statistics, deleting wrong statistics, or failure of measuring devices. The present paper attempts to investigate the flow rate of wastewater entering the sewage treatment plant (STP) for pumping station planning. The novelty of the research is using the Monte Carlo method, which is one of the simulators of the effect of the uncertainties in the timing and cost of the project, and Fourier series regression model to randomly generate data. These methods were used to simulate a ۱-minute time scale of sewage flow data for Zahedan. Considering the construction of the treatment plant in the last decade, this is the first research with this approach in this treatment plant. The results indicate that, this method has been successful in estimating sewage flow data in the hourly and minute intervals. Finally, ۲۷۰ days of flow data were obtained from a time interval of one minute with two methods of distribution: Lognormal function and a nonlinear Fourier series. Among these two methods, Fourier series' accuracy was higher in terms of statistical indicators. In this simulation, RMSE, d, CI and EF values for Fourier regression model are ۰.۲۹, ۰.۹۹, ۰.۹۹, and ۰.۹۹, respectively.

کلمات کلیدی:

probability distribution, Monte Carlo, Lognormal, Fourier series, Wastewater Inflow