Stochastické předpovědi přítoků do nádrže se zásobní funkcí

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Abstract

The main advantage of stochastic forecasting is fan of possible value, which deterministic method of forecasting could not give us. Future development of random process is described much better by stochastic then deterministic forecasting. We can categorize discharge in measurement profile as random process. Content of article is development of forecasting model for managed large open water reservoir with supply function. Model is based on linear autoregressive model, which forecasting values of average monthly flow from linear combination previous values of average monthly flow, autoregressive coefficients and random numbers. Autoregressive coefficient was calculated from Burgess equations (Burgess 1972). The model was compiled for forecast of 1 to 12 month. Data was got rid of asymmetry with help of Box-Cox rule (Box, Cox, 1964), value *r* was found by optimization. In next step were data transform to standard normal distribution. Our data were with monthly step and forecasting was recurrent. We used 90 year long real flow series for compile of the model. First 75 years were used for calibration of model (autoregressive coefficient), last 15 years were used only for validation. Outputs of model were compared with real flow series. For comparison between real flow series (100% successfully of forecast) and forecasts, we used as values of forecast average, median, modus and miscellaneous quintiles. Results were statistically evaluated on monthly level. The main criterion of success was average relative error between real and forecasting flow. On the other hand flow in month, which were forecasted recurrently from forecasting flow give smaller error than flow forecasted from real flow. Flows forecasted by the model give very fine results in drought period. Higher errors were reached in months with higher average monthly flows. This higher flow is caused by floods. The floods are very complexly predictable. If we evaluate all months together, we will decreased precision of outputs, but in months with higher average monthly flows is enough water. This is reason, why we could not give this time period same importance as drought periods. Due to good results in drought periods we can use the model for managed large open water reservoir with supply function.

Anotace:

Příspěvek obsahuje popis a konstrukci stochastického předpovědního modelu pro řízení nádrže se zásobní funkcí. Jedná se o adaptivní lineární rekurentní model, který obsahuje Burgesovy rovnice. Závěrem bylo provedeno vyhodnocení kvality předpovědí pro jednotlivé měsíce.

Klíčová slova: stochastický, předpověď, průměrný měsíční průtok

Anotation:

Content of article is development of forecasting model for managed large open water reservoir with supply function. Model is adaptive recurrently linear, which content Burges quations. Outputs of forecasting model were evaluated for each month.

Keywords: stochastic, forecasting, average monthly flow