

Interactive comment on “Acclimatizing Fast Orthogonal Search (FOS) Model for River Stream-flow Forecasting” by A. Osman et al.

Anonymous Referee #2

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The paper presents an application of one of the data-driven approaches to monthly flow forecasting of the River Nile flow at Aswan High Dam. The authors state that the objective of their paper is to “investigate the potential of utilizing the Fast Orthogonal Search (FOS) method to develop streamflow forecasting model that achieve consistent and reliable accuracy levels”.

The title of the paper and its objective stated by the authors suggest that using FOS is a requirement for developing a consistent and reliable forecasting model, whilst in truth it is just one of many possible techniques used in system identification and for training neural network-based models. For example, the authors could use Adaptive Orthogonal Search (Billings and Wei, 2008) for the same purpose. The paper is not clearly written and rather confusing. The authors formulate the forecasting problem as the Nonlinear Auto-Regressive Moving Average with eXogeneous inputs NARMAX

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model, but only one variable, flow rate is used. Therefore, the authors probably use a Nonlinear Auto-Regressive NLAR model. However, the reader can only guess which model is used because it is not presented in any detail and the authors themselves call it the FOS model.

The authors test three different training approaches for the identification of the polynomial relationship between past and future monthly flow rates using FOS system identification tools. There is no information on which computer package is used. The application of FOS is new in flow forecasting, at least to my knowledge, although it is a well-known technique in engineering applications. The authors present one application to the monthly flow forecasting of the River Nile, but they do not provide any new insight into the subject. In other words, it is not clear if this approach could be useful for other rivers and what we can learn from using it.

Apart from the very poor language that requires serious editing, the paper could serve as a caricature of a scientific paper. I do not think the authors read what they wrote. There is a number of repetitions, the authors give lists of references that are not relevant, statements are wrong or meaningless (see specific comments). I suggest the authors refer to the paper of Billings and Wei (2008) to improve their paper-writing skills and submit a corrected version of the paper as a technical note to some other journal. In my opinion, the paper is not suitable for publication in HESS.

Reference

Billings, S.A., Wei, H., 2008. An adaptive orthogonal search algorithm for model subset selection and nonlinear system identification. *Int. J. Control.* 81, 714-724.

Specific comments:

The title is not precise: I guess the authors meant “river flow forecasting”. I would suggest change “stream-flow” into “river flow” in the rest of the paper.

Page 1, lines 19-20: “In this paper, a novel model namely; Fast Orthogonal Search

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(FOS) model is proposed to develop river stream-flow forecasting.” This sentence states the FOS is novel which is not true. It was first published in 1989 by Korenberg (referred to by the authors) and it is not a model but an algorithm for system identification.

Page 2, line 9-10 repeats line 8-9.

Page 3, lines 10-20 and page 4 lines 1-10 are only two examples of very poor writing style mentioned in the general comments.

Page 4, equation (5): the $f(m)$ function is not specified and therefore the model structure is not given.

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