

**Review report “Modeling of pump performance in a water pumping plant” by Fouad Laajine, Mohammed Machkor and Diss Mazouzi**

**General comments**

The manuscript describes the modelling of a drinking water pumping station using multiple linear regression to model the kWh/m<sup>3</sup> ratio depending on the input parameters. It finishes with the technical interpretation of the outcome of the model.

Although the approach is quite original, as it takes into account the real behaviour of the system, major revisions are required. There are many unclear sections in the manuscript, the Results and Discussion section is too concise, the English language has to be improved (the wording, many typo's, inconsistent use of capital letters (e.g. Multiple Linear regression, Multiple linear regression)) and the Tables and Figures are not well explained in the manuscript. The manuscript looks like a short report and not as a scientific manuscript as any reference to other scientific papers, with the same approach or alternative approaches, is missing. This should be included in the introduction and discussion sections. In the present form it cannot be accepted.

**Specific comments**

*Abstract*

Line 15: what is meant by “real behaviour”?

Line 16: First should be first

Line 18: mention the input parameters

Line 19: what is meant by “phenomenon”?

*Introduction*

In the introduction any reference to other scientific papers dealing with optimizing pumping stations is missing.

Line 35: What is the current 2023 agenda?

Line 40: pumps account for 80% to 90% of the energy consumption, this depends on many factors (surface water or ground water, transport differences, flat or mountain region, etc).

*Materials and Methods*

- Lines 61-62: nice figure, but how does this research fits in this figure? To which category is it connected?

- line 86: tank RCMO? What does RCMO mean?

- line 87: probably the capacity of the pump is 457 m<sup>3</sup>/h?

- Lines 89-90, Figure 5: Are the ND of the suction line and the discharge line correct? They are not in line with the text I lines 79-82.

- Lines 97-103: the parameters should be defined in more detail. It is a list of parameters, while in the model eight input parameters are used: I assume the last (HMGI) covers four pumps? Be precise.

- Line 110: Y is the output variable.

- Lines 117-118: Table 1 is not clear. Just include the objective (not “1”), the variables (not “8”, the responses (not “1”).

- Line 119: Rephrase: Table 1 shows instead of The table above.

- Lines 122-123, Table 2: mean and standard deviation over the 4-years period?

- Line 123: Rephrase: Table 2 shows then mean and standard deviation

- Lines 125-126, Figure 6: What does this figure shows? What is on the Y-axis? What do the markers \* and # mean?
- Line s128-129 Figure 7: This is a strange representation of a box plot. What is on the Y-axis? What do the p-values mean?

### *Results and Discussion*

- there should be references to other studies (see also comment in the introduction). This is only a bullet-list of the main observations without any discussion. Please rewrite.
- Line 135: what is P?
- Line 138: What is Q?
- Lines 150-155: I suppose that "ratio" is kWh/m<sup>3</sup>?
- Line s156-157, Table 5: Table 5 is not clear, needs to be explained. Two situations, b and b\*? not clear.
- Line 166: Multiple linear regression has *shown* that....
- line 167: Not clear, what is meant by "adjusted"?
- lines 174-191: Technical interpretation is nice, but it only deals with this case. Compariosn should be made with other approaches described in literature. Only one comparison is made in line 187 (five data-mining approaches), but it is not discussed whether this comparison is allowed.

### *Conclusions*

- They should be rewritten. It is now just one sentence what the study was about and a couple of recommendations. What can be concluded from the research? Does the approach work? Is it different from other approaches? Etc.

### **Principle criteria**

Scientific significance: fair  
 Scientific quality: poor  
 Presentation quality: poor