Referee report for the Electronic Journal of Differential Equations for the paper by B. Enanizadeh and R.I. Fernandes, "Optimization of the principal eigenvalue of the one dimensional Schröedinger operator"

In this paper, the authors analyze the following problem: Let $\mathcal{R}$ be the class of rearrangements generated by a function $f_0 \in L^\infty(-1,1)$. Then, they look for

$$\inf_{\mathcal{R}} \lambda_1(\alpha, f) \qquad \text{and} \qquad \sup_{\mathcal{R}} \lambda_1(\alpha, f)$$

where λ_1 is the first eigenvalue of the one-dimensional Schröedinger operator

$$\begin{cases} -u'' + \alpha f(x) u = \lambda u & \text{in } (-1,1) \\ u(0) = u(1) = 0 \end{cases}$$

The results in this paper are new and interesting. Therefore, we recommend this paper for publication in this Journal, subject to this minor corrections.

- Page 2, line 4: $D \subset (-1,1)$ instead of $D \in (-1,1)$.
- Page 7, line 16: there is an u_n where it should read u.
- Page 7, equation (4.18): The equality must be replaced by a $\geq$.
- Page 8, the inequality between (4.23) and (4.24): It must say $\lambda_1(\alpha, f+h) - \alpha \int_{-1}^{1} h u_{\alpha,f+h}^2 \, dx$ (there are a plus sing instead of the minus one).
- Page 9, lines 3 and 5: It is $\|h\|_\infty \to 0$.
- Page 9, line 9: $u_{\alpha,g}^2$ instead of $u_{\alpha,g}$.

We also want to make some comments and questions on the paper:

- Since the arguments are mainly variational, it appears that the results can be obtained (with minor changes) for the $p-$laplacian case. Have the authors consider that?
- Have the authors consider what happens if the function f_0 is in some L^p-space with $p < \infty$?
- Corollary 4.1 seems to be redundant. I would advise in remove it.