Disadvantages of the Betz model

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Humanity has been looking for possible options for renewable energy sources for a very long time [1]. Wind power is one option. However, as with all such theories, it is important to have a theoretical understanding of the maximum possible efficiency of such engines. In fact, there is a widespread belief that the upper limit is the Betz part of 59% [2]. It is important to note that this is a numerical value, which is, of course, tempting. However, the Betz model has a number of disadvantages. Problems with the Betz model have already been noticed in the literature [3]. In this paper, it is shown that the Betz model is not physical, and there is an error in the calculation of efficiency. The main problem is that in the standard output the extracted work is divided not by the input flow of kinetic energy, but by the intermediate value of this flow. Also, the Betz model implies two singularities: localization of force and constant density.

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