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Pump as turbine (PAT)

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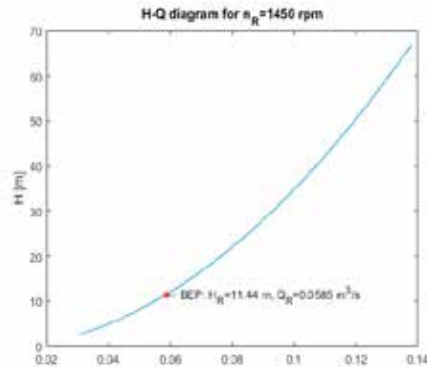
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Background

For small hydropower plants, both in Norway and in developing countries, the issue is to reduce the turbine price as far as possible. Efficiency is not necessarily the highest priority. A centrifugal pump run in reverse is a good option. It has relatively good efficiency, it is a robust construction, and much cheaper than a turbine. The main reason for the low price is that pumps are mass produced, and there is no wicket gate. The problem is to pick the right pump for a set of head and flow conditions.



Predicted turbine characteristic of the pump scheduled to be tested in Dar es Salaam (UDSM)

In the project work a theoretical model was established to predict the optimal operating conditions for a given pump run as a turbine. This prediction model differs from previous techniques in that it is solely based on the pump geometry. To validate the prediction model tests have to be carried out. These tests are scheduled to be conducted both at the University of Dar es Salaam, Tanzania, and at the Waterpower Laboratory at NTNU.



Part of the test rig at UDSM used for model validation, with the pump used as turbine installed