POSST DOC.

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Fluid structure analysis of a model Francis turbine

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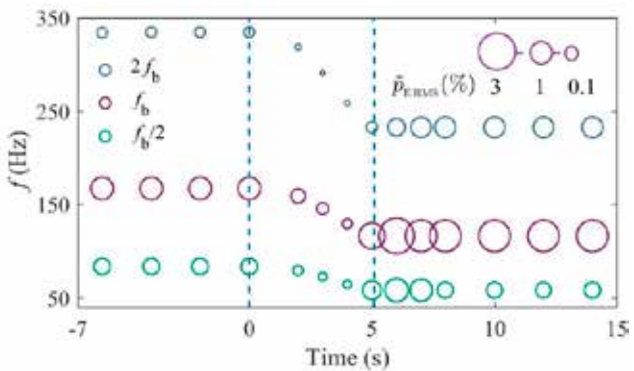
Background

Although hydraulic turbines are expected to operate seamlessly during steep ramping, the resulting pressure amplitudes are so significant that they take a toll on a machine's operating life. Objective of the present study is to design and develop a Francis turbine that enables flexible operation and accommodate steep-ramping with several start-stop cycles per day.

I am responsible for specific research tasks in three R&D projects, i.e., #HiFrancis, #HydroCen and #HydroFlex. I am also responsible to manage #Francis-99 workshop series, which allows hydropower researchers and gives the possibility to explore their capabilities and enhance their skills.

- Verification and validation of numerical models
- Fluids structure interaction
- Unsteady pressure and velocity measurements in Francis turbine
- Design of a variable-speed Francis turbine
- Lifetime estimation of a Francis Turbine subject to heavy ramping-rate
- Sediment erosion and determining wear characteristics of a Francis turbine



$$\%_{\mathrm{E}} = \frac{p(t) - \bar{p}(t)}{(\rho E)_{\mathrm{BEP}}}$$

$$\%_{\mathrm{E\,rms}} = \frac{\%_{\mathrm{E}}}{\sqrt{2}}$$