

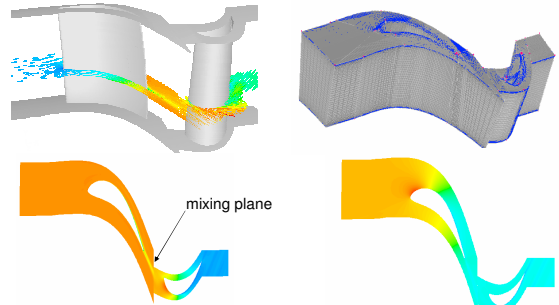
Simulation of rotating fluid machines

Four different approaches are possible:

- Actuation disk model - fan
- "Frozen" rotor model - rotating frame of ref.
- Mixing plane model - mixing interfaces
- Sliding mesh model - sliding interfaces

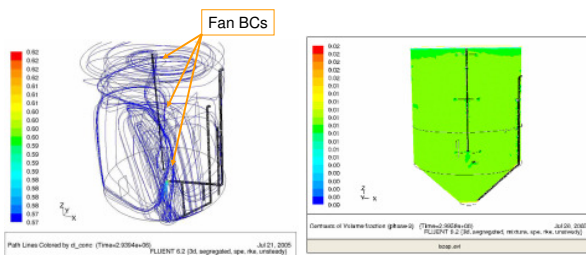
3. Mixing plane model

One cascade of a SIEMENS steam turbine.
We can take the advantage of periodic boundary conditions...



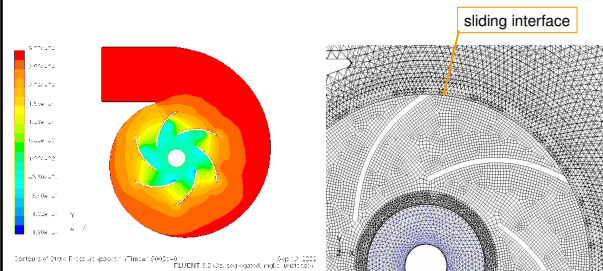
Total pressure in absolute frame of reference...and in co-rotating frame of reference

1. Actuation disk model



Thermophilic fermenter used for biogas production at Budapest Sewage Works.
This approach allows long term simulations.

4. Sliding mesh model



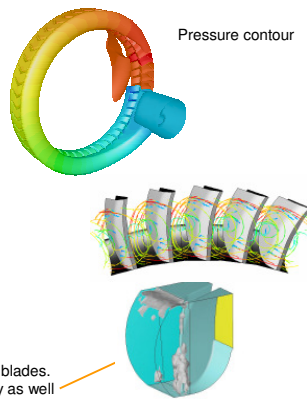
If the pressure is uneven in the casing, then each blade passage is exposed to a fluctuating outlet pressure.
Local acceleration can be taken into account.
Grid aligned quadrilateral cells must be used at the interface.
This approach works for axial flow machines as well. :

2. Frozen rotor model

PI. side channel fuel pump



Pressure contour



Usually acceptable if there are many blades.
We can assume pitch wise periodicity as well