Temperature front velocity in a two phase flow geothermal system

YAPI DONATIEN ACHOU

1 OUTLINE

In this project the aim is to simulate the temperature front velocity in a two phase flow geothermal systems. This project is the natural continuation of [1]. In [1] the thermal front velocity of cold fluid injected into a single phase geothermal reservoir was computed. In this project the questions to be answer are:

1)How fast the thermal front velocity moves in a two phase flow geothermal reservoir

2)What are the affects of the cold front on phase fraction of steam and water in the production pipe

2)What are the effects of the cold front on the pressure drop along the production well

Electricity production in from geothermal energy rely on a sufficient amount of phase fraction from the production well. Injection of cold water increases the energy extracted from the system. However cooling of production wells can be induce during injection of colder fluid.

2 SOFTWARE

The software used in this project are OpenFoam, FEniCs, HOla. OpenFoam is an open source computational fluid dynamics software. Hola is a two phase flow well simulator developed in Iceland Goesurvey. In this project, OpenFoam will be used to simulate a two phase flow of geothermal fluid in a vertical and horizontal pipe. Hola will be used to simulate a steady state flow in the well and it output will served as the inlet boundary condition for the pipe. FEniCs will be used to simulate the thermal front velocity in the geothermal reservoir.

3 PROGRESSION

The different step are: 1)literature review
2)simulation
3)writing

In the literature review the different models equations are selected and tested during the simulation.

4   TIMING

An estimation of 350 hours will be devoted to this project. Starting time in set to January 2015.

REFERENCES

[1] Y.D Achou. An effective method to compute thermal front velocity in geothermal system. *26th Nordic Seminar in Computational Mechanics*, 2013, Oslo.