

FEA { comsol multiphysics chamber and -fluid, (流场和力场 coupling)
 ansys (50000) fluid dynamic
 (CFD)

Assumption:

rigid chamber (interaction between (不考虑时间变化))
 static fluid (pipe rolls uneffect fluid inside)
 laminar flow (constant viscosity.)
 (constant)

CFD: geometry (model cavity instead of structure)
 boundary conditions { 压强 P
 流速 V
 (向量场分布)
 fluid properties
 { density
 viscosity
 雷诺数 (区分层流和湍流)

Needs:

- ① 压力 / 管道形状 直径, 长度.
- ② 流速 viscosity. (始态和终态)

流热场 coupling Non-linear material
 一般液体在热区 viscosity \downarrow velocity
 convection.

fluid $\int \rho$

material \int 应变 strain
 应力 stress

热力学 \int heat flux
 temperature

engineering drawings (大图) 插图

管道是 rigid chamber 电子流注.

速率 \propto 长度,

液体 incompressible