



中国仿真互动

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Simwe公开课系列之

—— ANSYS使用

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仿真的网络互动的生活

ANSYS使用交流

- 一、ANSYS初接触
- 二、起始层
- 三、前处理层
- 四、求解层
- 五、后处理层

一、ANSYS初接触

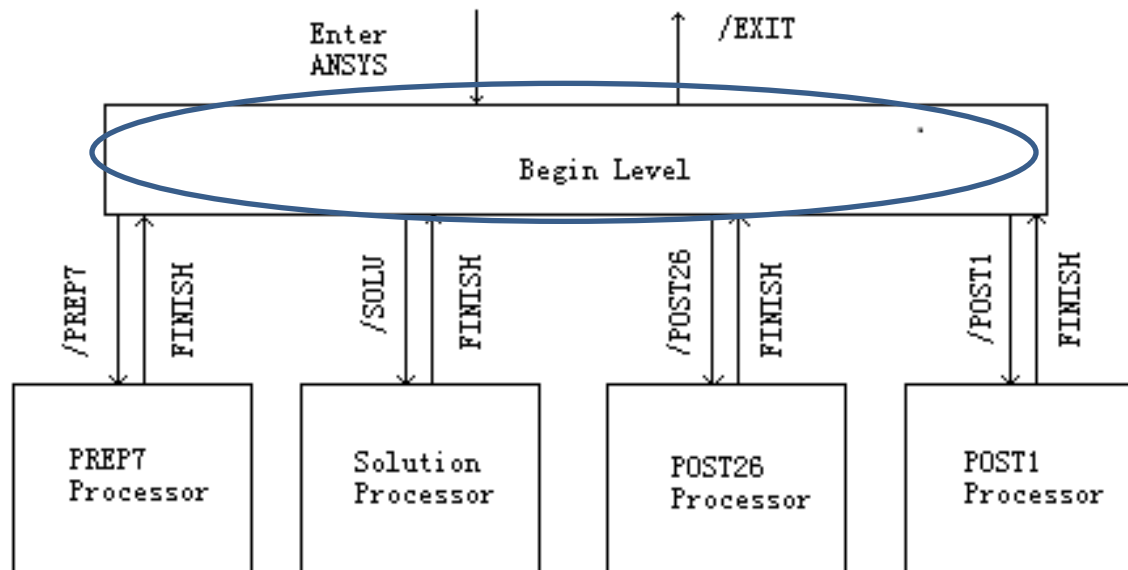
- 1. ANSYS使用需要一定的理论基础;

$$\rho c \frac{\partial T}{\partial t} = \frac{\partial}{\partial x} \left(\lambda \frac{\partial T}{\partial x} \right) + \frac{\partial}{\partial y} \left(\lambda \frac{\partial T}{\partial y} \right) + \frac{\partial}{\partial z} \left(\lambda \frac{\partial T}{\partial z} \right) + \Phi$$

- 2. GUI VS. CML
- 3. 做好记录
- 4. Workbench vs. ANSYS MultiPhysics

二、ANSYS起始层

- 1. CML起始层工作



二、ANSYS起始层

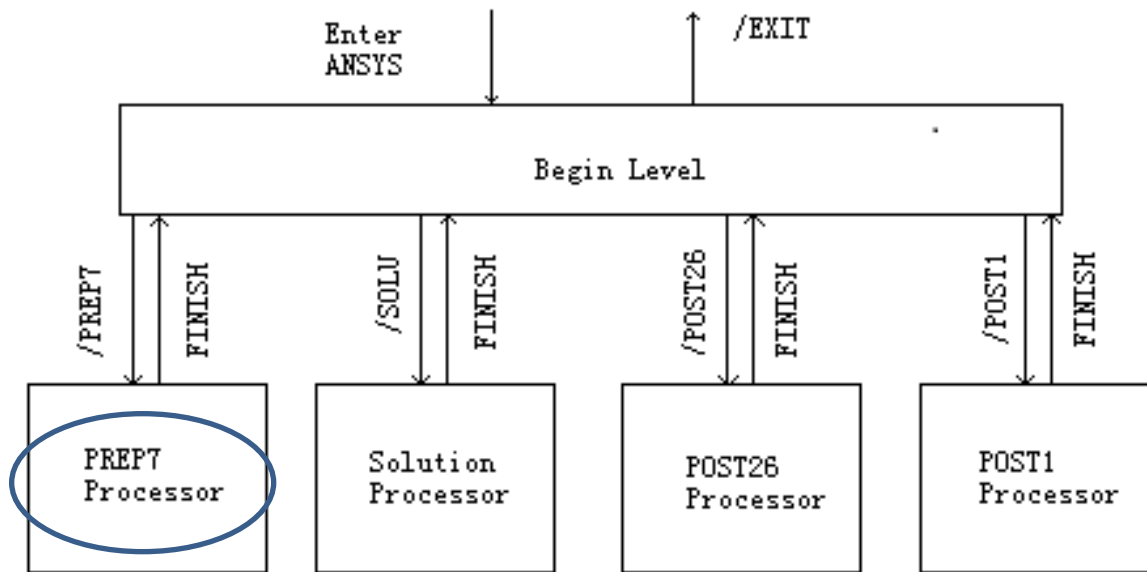
- 2. CML快速恢复法

- *!程序说明*
- *Fini*
- */clear,start*
- */filename,zfile*
- */title, Structure Analysis*
- */units,si*
- */pnum,kp,1*
- */pnum,line,1*
- */pnum,area,1*
- */pnum,volu,1*

- 3. 单位制问题

三、ANSYS前处理层

• 1. 前处理层工作



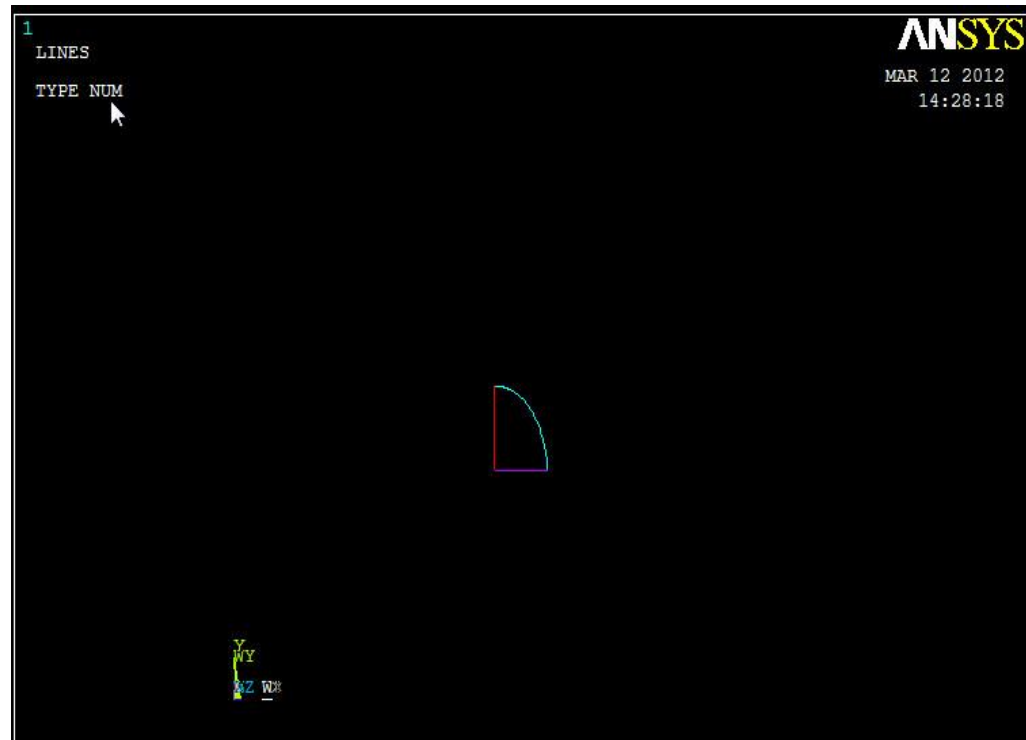
- Preferences
- Preprocessor
 - Element Type
 - Real Constants
 - Material Props
 - Sections
 - Modeling
 - Meshing
 - Checking Ctrl
 - Numbering Ctrl
 - Archive Model
 - Coupling / Ceqn
 - FLOTRAN Set Up
 - Multi-field Set Up
 - Loads
 - Physics
 - Path Operations
- Solution

三、ANSYS前处理层

- 2. ANSYS作图vs.工程软件做图

三、ANSYS前处理层

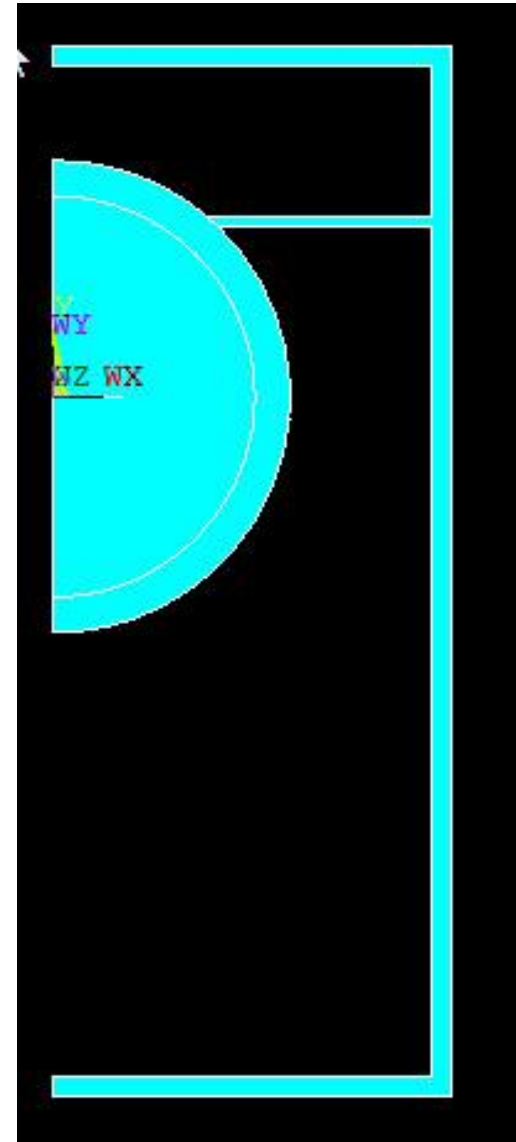
- 3. ANSYS命令
- 4. 灵活使用参考点
- 5. 灵活使用局部坐标系
- *K,100,500E-3,400E-3,600E-3*
- *Kwplane,,100*
- *Cswplan,11,2,150/100*
- *Csys,11*
- *K,101,100e-3,0*
- *K,102,100e-3,90*
- *L,102,101*
- *Csys,0*
- *L,101,100*
- *L,102,100*
- *Wpcsys,0*



三、ANSYS前处理层

- 6.灵活使用numstr命令
- 7.灵活使用线组合建模

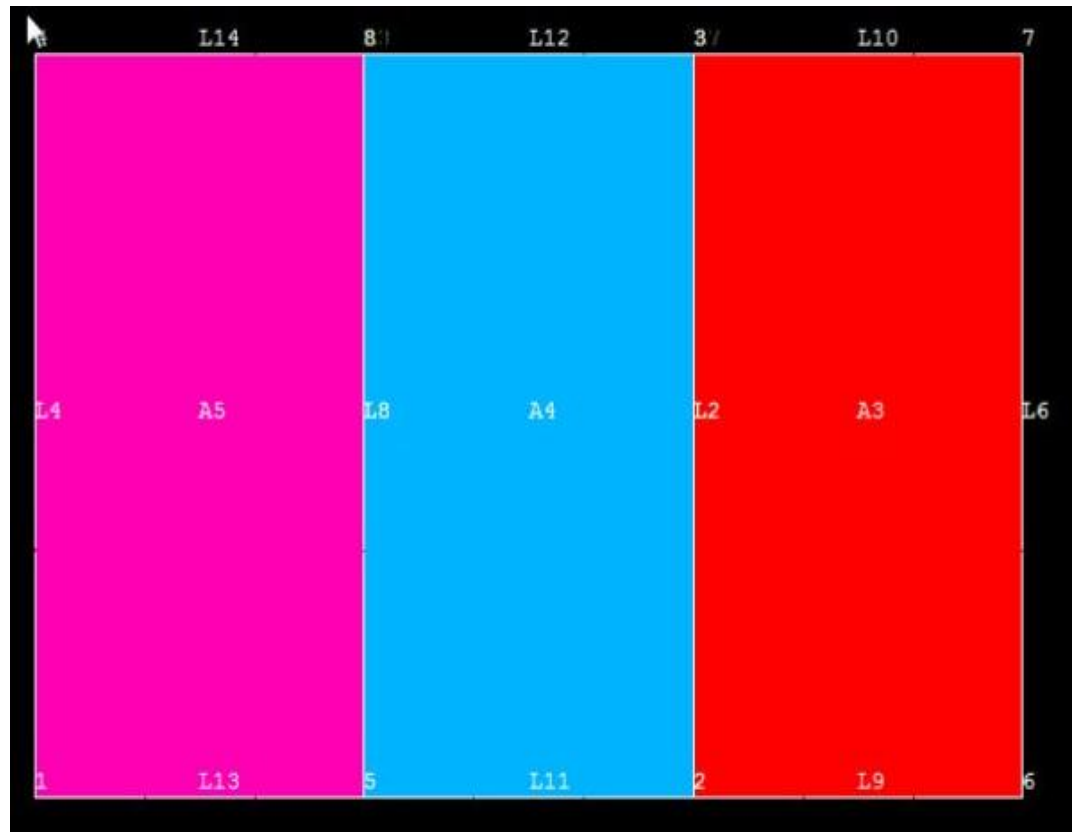
- ! 内部封闭气体平面
- `CYL4,0,0,0,-90,42.5e-3,90`
- ! 杯平面
- `CYL4,0,0,42.5e-3,-90,50e-3,90`
- ! 边框
- `rectng,0,84e-3,70e-3,74e-3`
- `rectng,80e-3,84e-3,-148e-3,70e-3`
- `rectng,0,80e-3,-148e-3,-144e-3`
- ! 上夹板
- `rectng,0,80e-3,36e-3,38e-3`
- `asbl,6,4,,delete,keep`
- `adelete,8,,,1`
- `aglu,2,7`
- `aadd,3,4,5,7`
- `lcomb,9,23,0`
- `lcomb,12,27,0`



三、ANSYS前处理层

- 8. glue vs. overlap
- *Rectng,0,0.5,0,1*
- *Rectng,0.5,1,0,1*
- *Aglue,1,2*

- *Rectng,0,1,0,1*
- *Rectng,0.5,1.5,0,1*
- *Aovlap,1,2*



三、ANSYS前处理层

- 9. ANSYS对称性问题
- 10. 材料参数设置
- 11. 实体属性
- *Vsel,s,volu,,1*
- *Vat,1,1,1*
- *Vmesh,1*
- *Vsel,s,volu,,2*
- *Vat,2,2,2*
- *Vmesh,2*

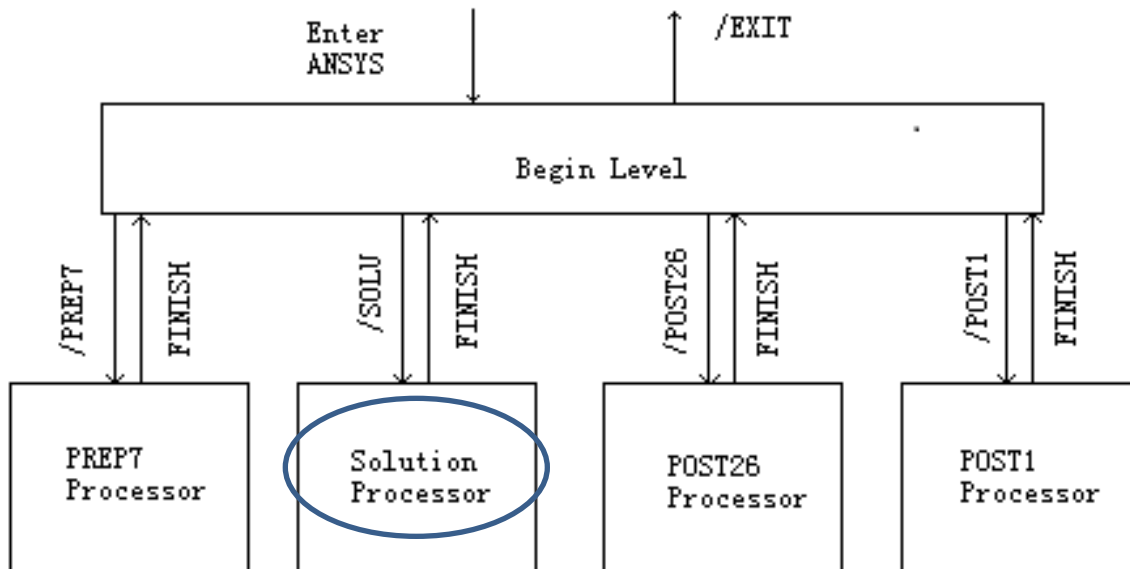
三、ANSYS前处理层

• 12.接触定义

- *Et,1,170*
- *Et,2,174*
- *R,1*
- *Rmodify,1,5,0.3*
- *R,2*
- *Rmodify,1,5,0.3*
- *Asel,s,area,,1*
- *Nsla,s,1*
- *Type,1*
- *Real,1*
- *Esurf*
- *Asel,s,area,,3*
- *Nsla,s,1*
- *Type,2*
- *Real,2*
- *esurf*

四、ANSYS求解层

- 1. 求解层



- **Solution**
 - + Analysis Type
 - + Define Loads
 - + Load Step Opts
 - + SE Management (CMS)
 - Results Tracking
 - + Solve
 - + Manual Rezoning
 - + Multi-field Set Up
 - + Diagnostics
 - Unabridged Menu
 - + General Postproc

四、ANSYS求解层

- 2. 对称约束
 - *Nsel,s,loc,x,0*
 - *DSYM,symm,x,0*

 - *Nsel,s,loc,x,0*
 - *D,all,uy,0*
 - *D,all,rotx,0*
- 3. 组合约束

四、ANSYS求解层

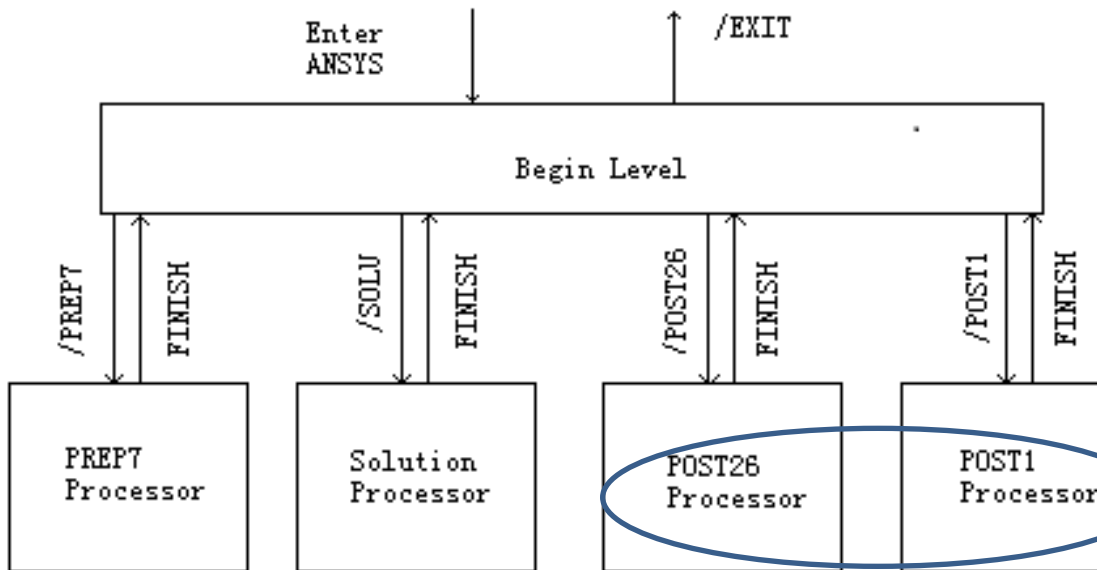
- 4. Deltim vs. nsubst
- 5. Tref vs. Tunif

$$\left. \begin{aligned} \varepsilon_{xx} &= \frac{\partial u_x}{\partial x} = \frac{1}{E} \left[\sigma_{xx} - \nu (\sigma_{yy} + \sigma_{zz}) \right] + \alpha \tau \\ \varepsilon_{yy} &= \frac{\partial u_y}{\partial y} = \frac{1}{E} \left[\sigma_{yy} - \nu (\sigma_{xx} + \sigma_{zz}) \right] + \alpha \tau \\ \varepsilon_{zz} &= \frac{\partial u_z}{\partial z} = \frac{1}{E} \left[\sigma_{zz} - \nu (\sigma_{xx} + \sigma_{yy}) \right] + \alpha \tau \end{aligned} \right\}$$

- $\tau = T - T_{ref}$

五、ANSYS后处理层

- 1. 后处理层
- 后处理器POST1
- 时间历程处理器POST26



- ⊕ Solution
- General Postproc
- ▣ Data & File Opts
- ▣ Results Summary
- ⊕ Read Results
- ▣ Options for Outp
- ▣ Results Viewer
- ⊕ Load Case
- ⊕ Check Elem Shape
- ▣ Write Results
- ⊕ ROM Operations
- ⊕ Fatigue
- ⊕ Define/Modify
- ⊕ Manual Rezoning

- ⊕ General Postproc
- TimeHist Postpro
- ▣ Variable Viewer
- ⊕ Settings
- ▣ Store Data
- ▣ Define Variables
- ⊕ Read LSDYNA Data
- ▣ List Variables
- ▣ List Extremes
- ▣ Graph Variables
- ⊕ Math Operations
- ⊕ Table Operations
- ▣ Smooth Data
- ▣ Generate Spectrm
- ▣ Reset Postproc
- ⊕ Topological Opt

五、ANSYS后处理层

- 2. Inresult vs. file
- 3. Set vs. *set
- 4. *Fopen & *fclose
- 5. Fortran style
- A8、F10.4、5X、‘ ’ 等



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致谢！

感谢各位会员的支持！

感谢Simwe提供的交流平台！

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