

## Benchmark GDR MOMAS

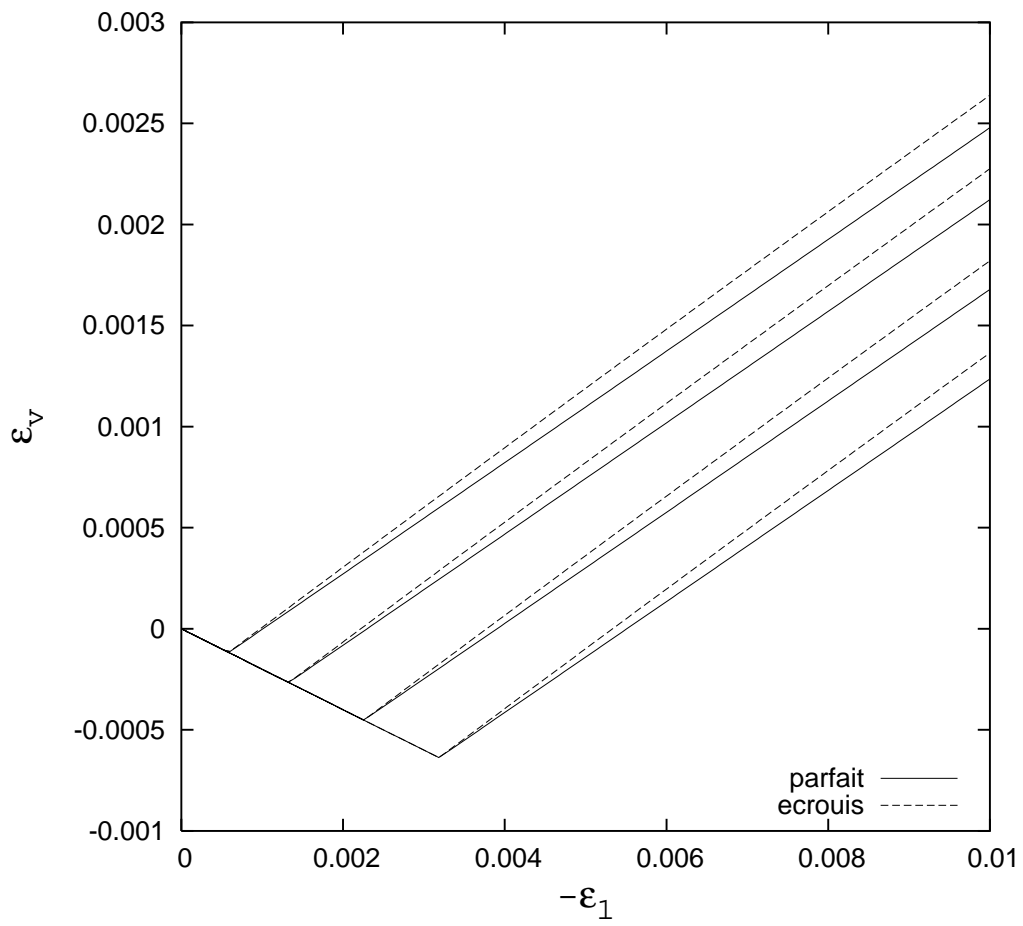
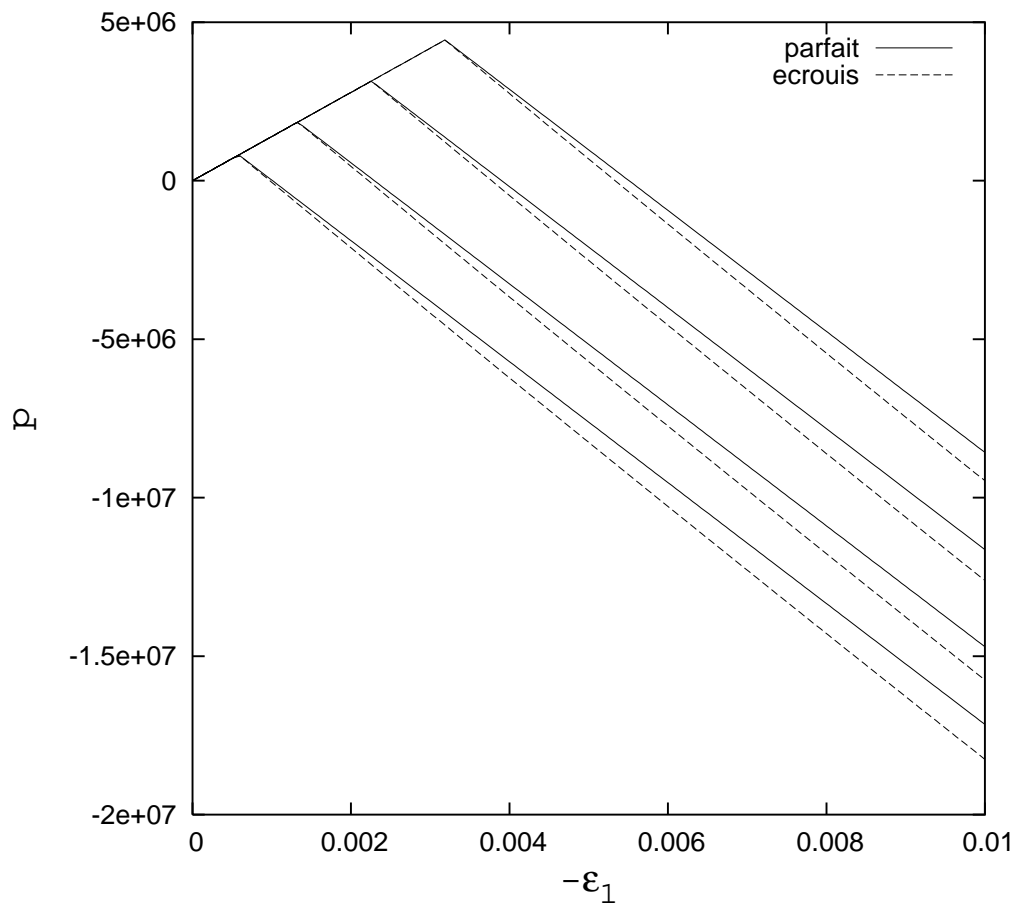
P. Dangla

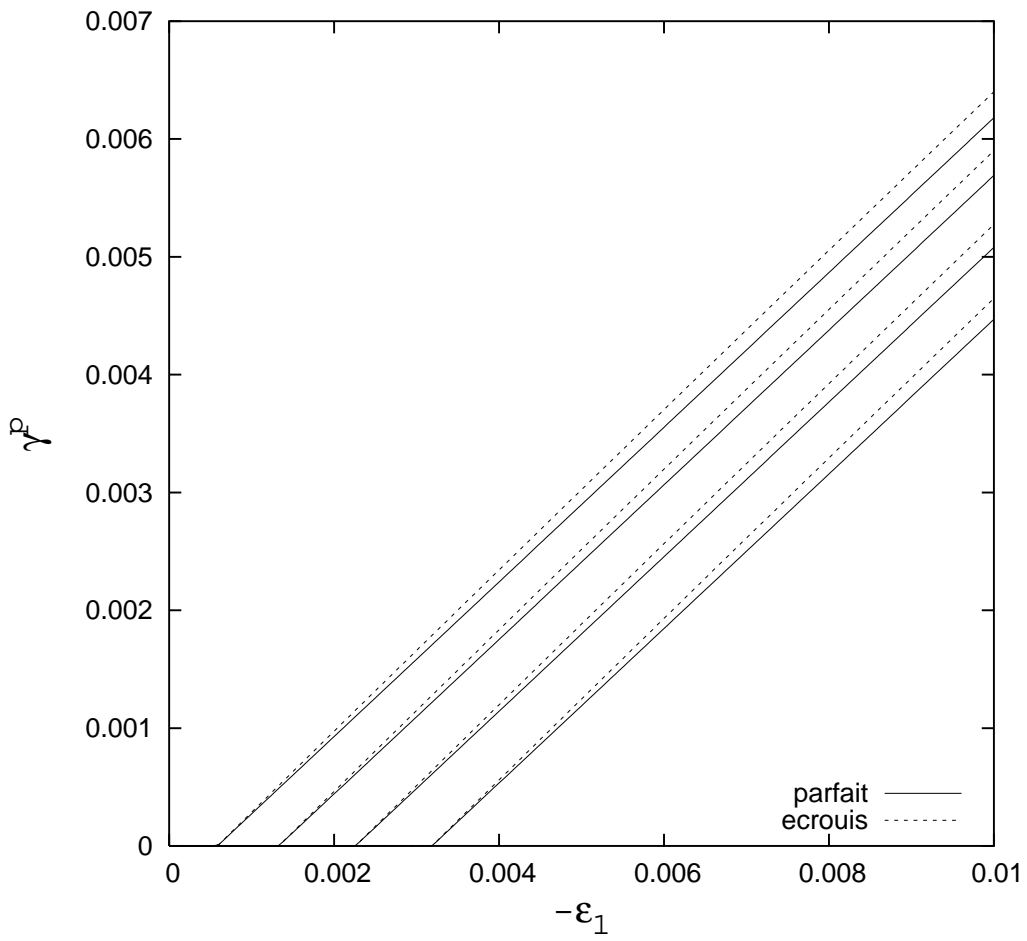
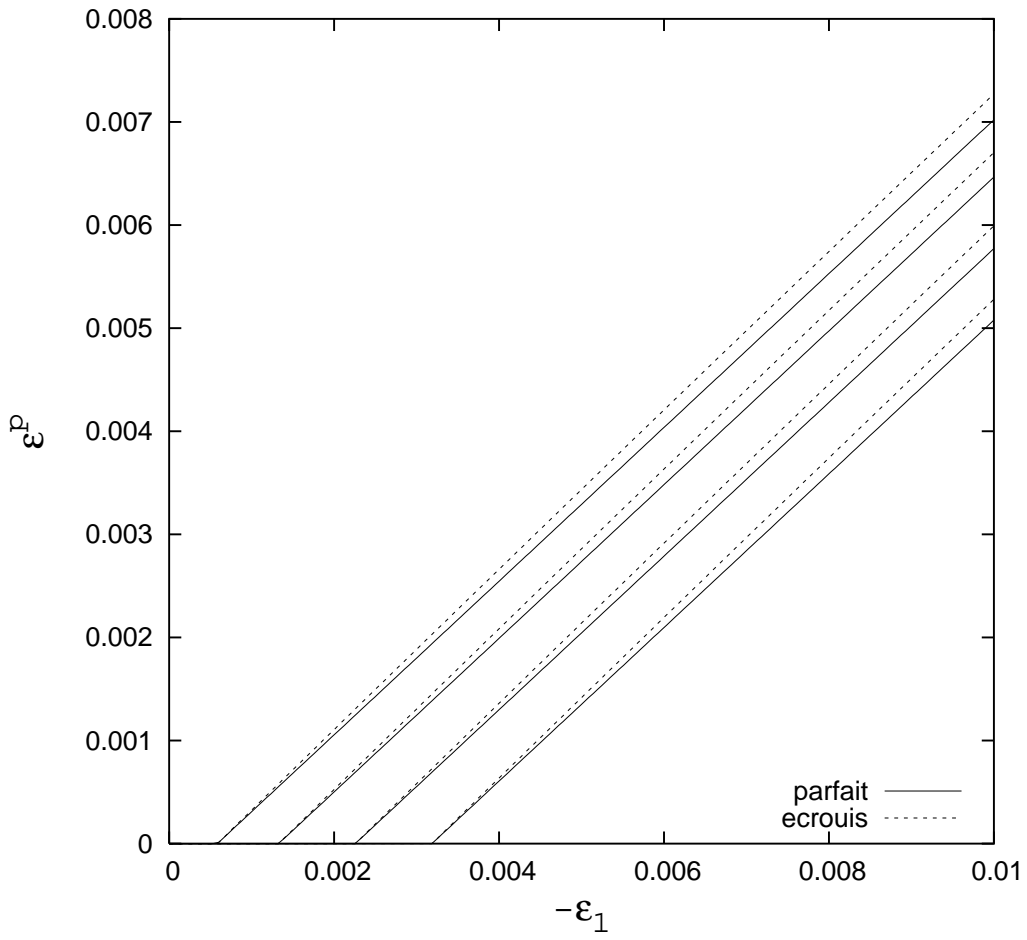
Qqs remarques:

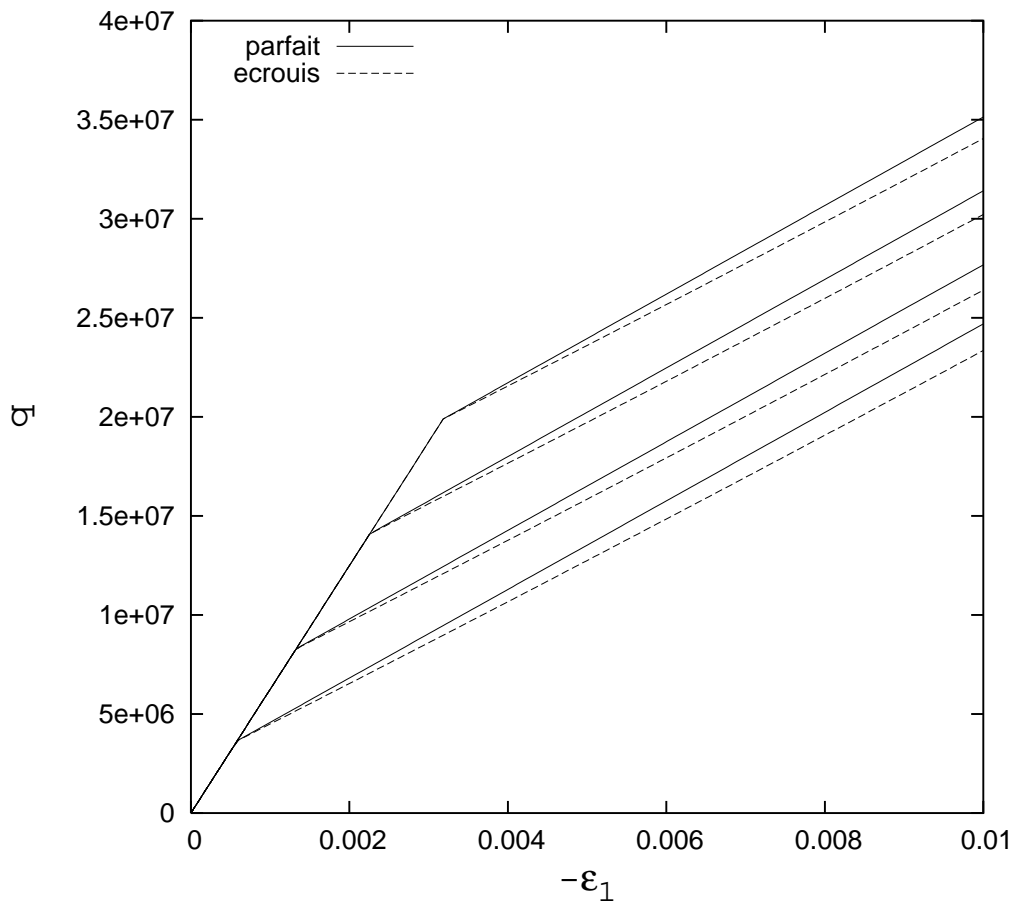
- $\gamma_p = \int_0^t \sqrt{\dot{\underline{\underline{e}}}} : \dot{\underline{\underline{e}}} dt$
- $d\varphi = b d\epsilon_v + \frac{b-\varphi}{K_s} dp_e$
- $\underline{\underline{\sigma}}' = \underline{\underline{\sigma}} + b S_e p_e \underline{\underline{1}}$  (Bishop) néglige les interfaces  
 $\underline{\underline{\sigma}}' = \underline{\underline{\sigma}} + b(S_e p_e - \frac{2}{3}U) \underline{\underline{1}}$   $U = \int_{S_e}^1 p_e(s) ds$

## Triaxial

- 1 élément 2D à 4 noeuds
- 3700 pas de temps de calcul
- critère de convergence :
  - $\frac{\delta u}{u_o} < 10^{-4}$  avec  $u_o = 10^{-3}$  m
  - $\frac{\delta v}{v_o} < 10^{-4}$  avec  $v_o = 10^{-3}$  m
  - $\frac{\delta p}{p_o} < 10^{-4}$  avec  $p_o = 10^5$  Pa
- 3 itérations pour  $\Delta\epsilon_1 = 5.10^{-5}$

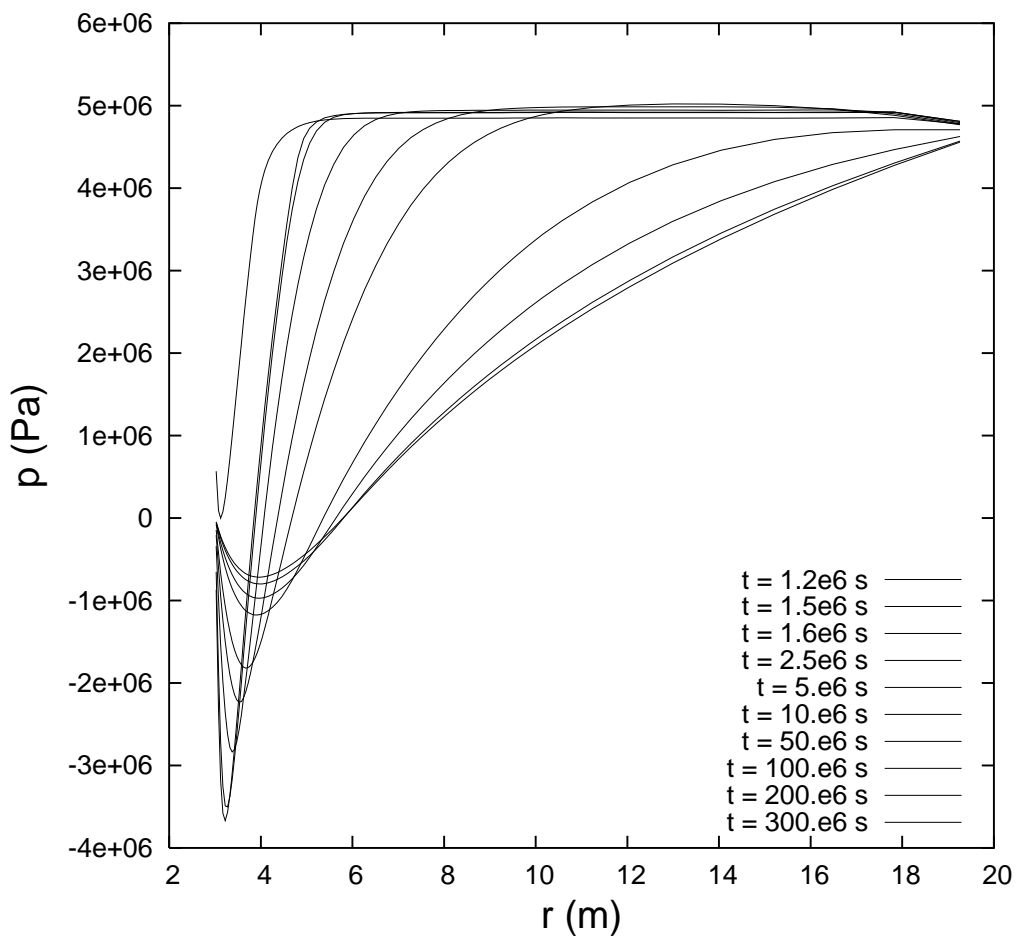
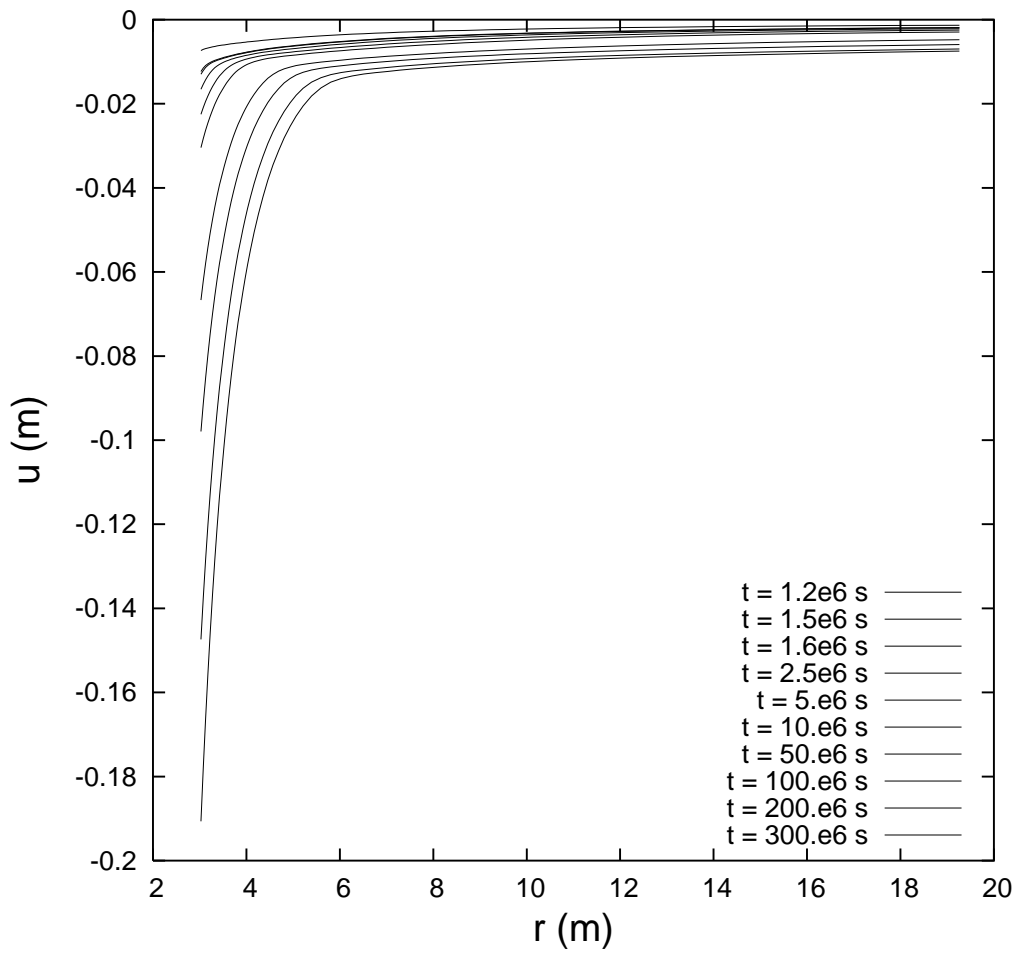


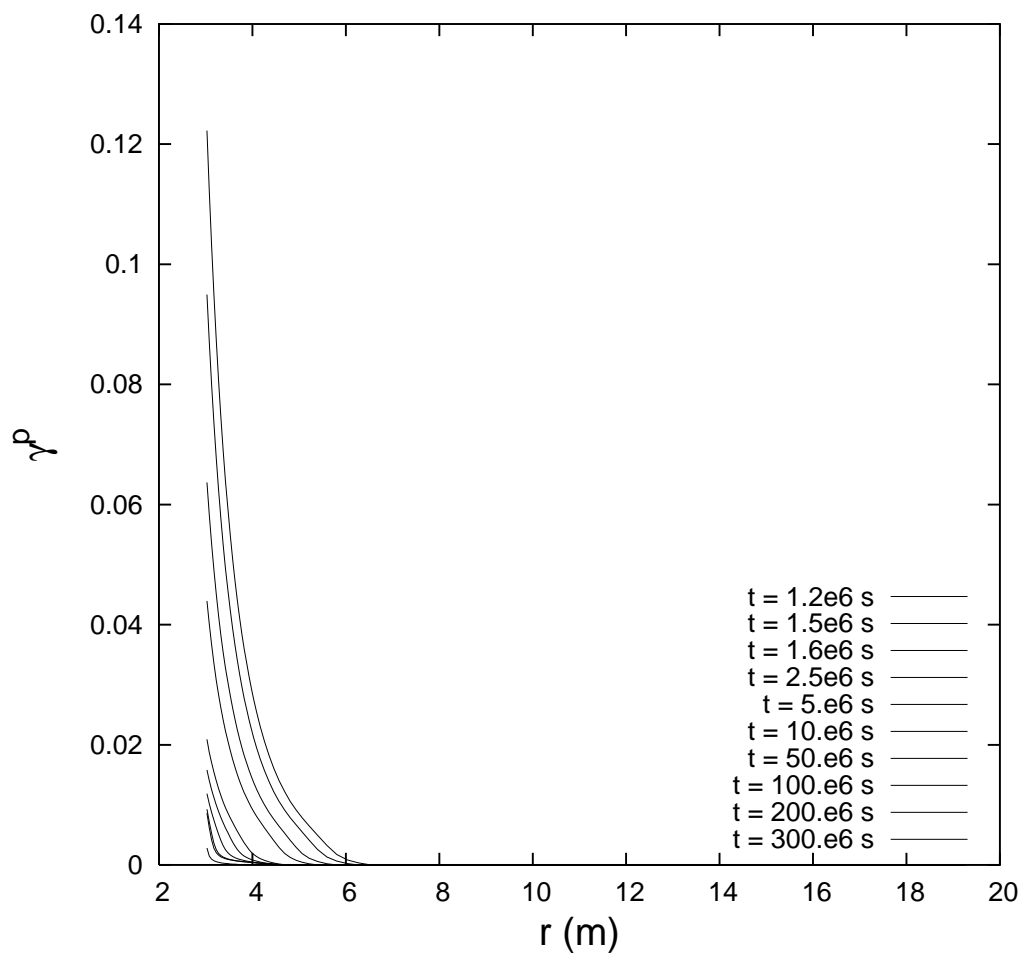
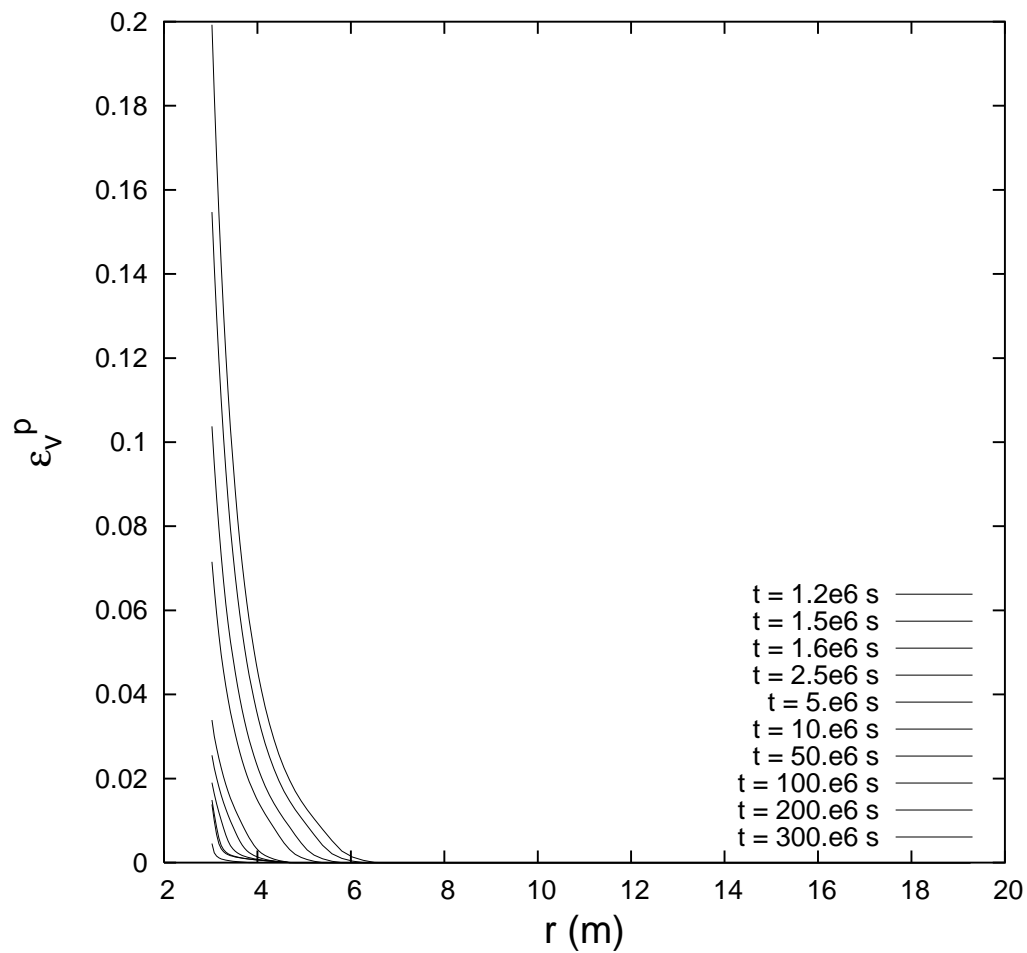


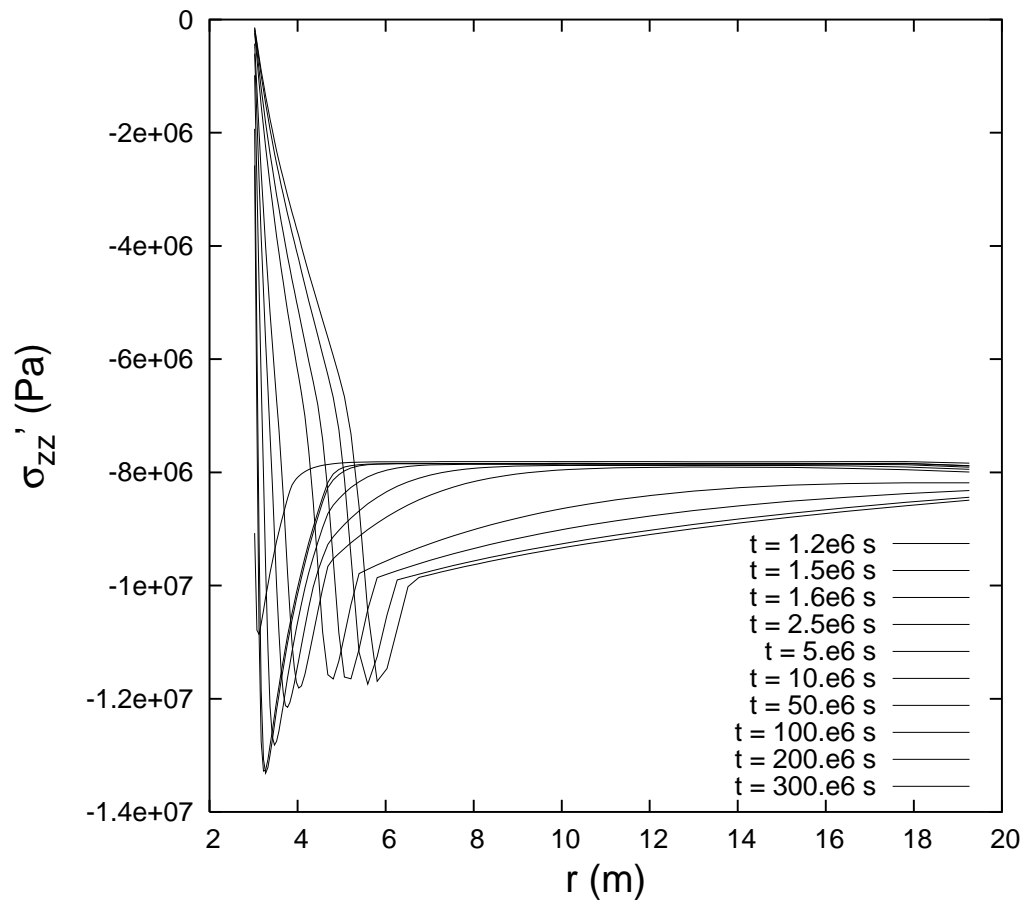
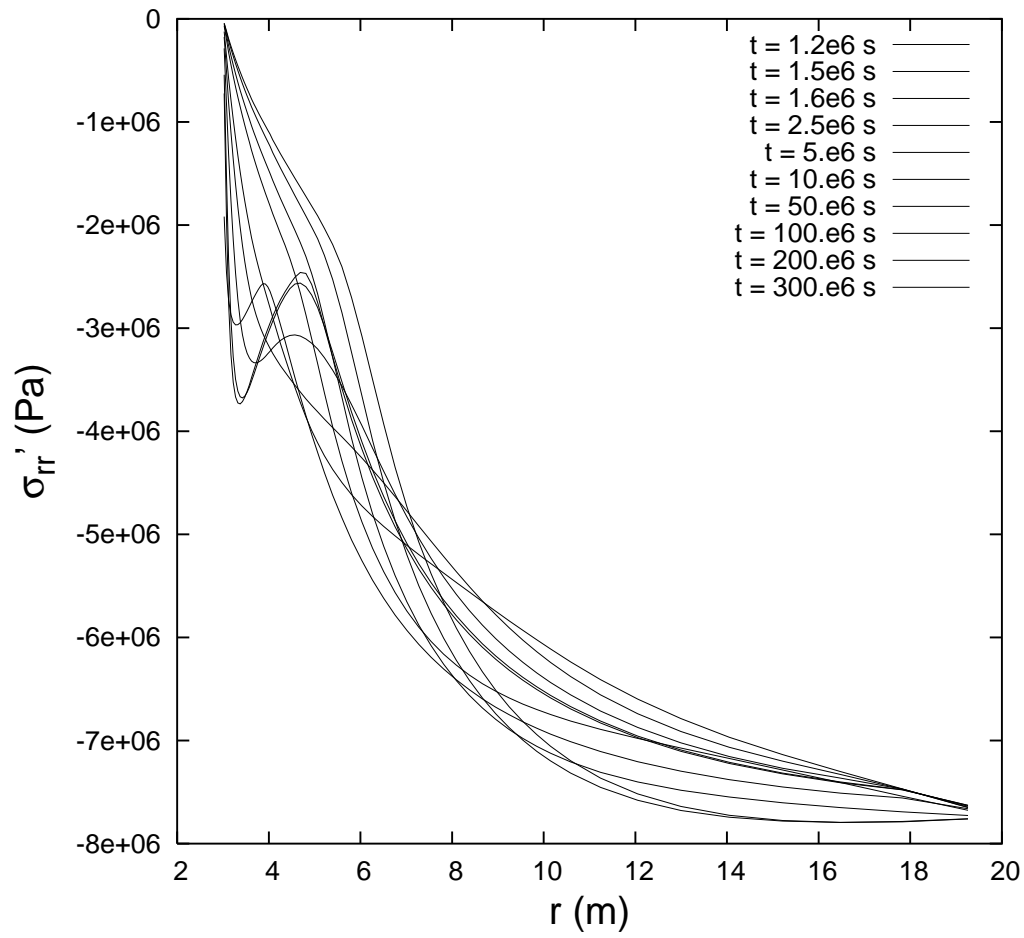


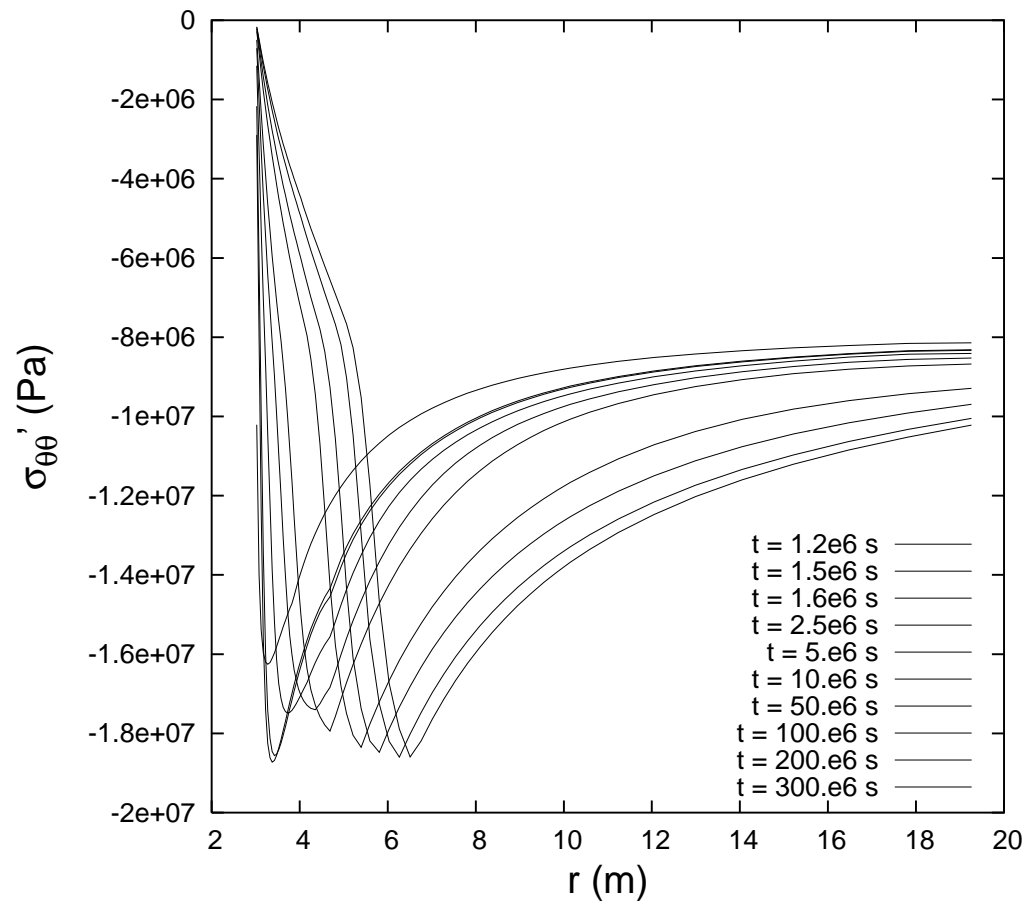
## Test 1

- 100 éléments 1D
- 400 pas de temps de calcul
- critère de convergence :  
$$\frac{\delta u}{u_0} < 10^{-4} \text{ avec } u_0 = 10^{-3} \text{ m}$$
$$\frac{\delta p}{p_0} < 10^{-4} \text{ avec } p_0 = 10^5 \text{ Pa}$$
- 50 itérations pour  $\Delta t = 2.10^6 \text{ s}$



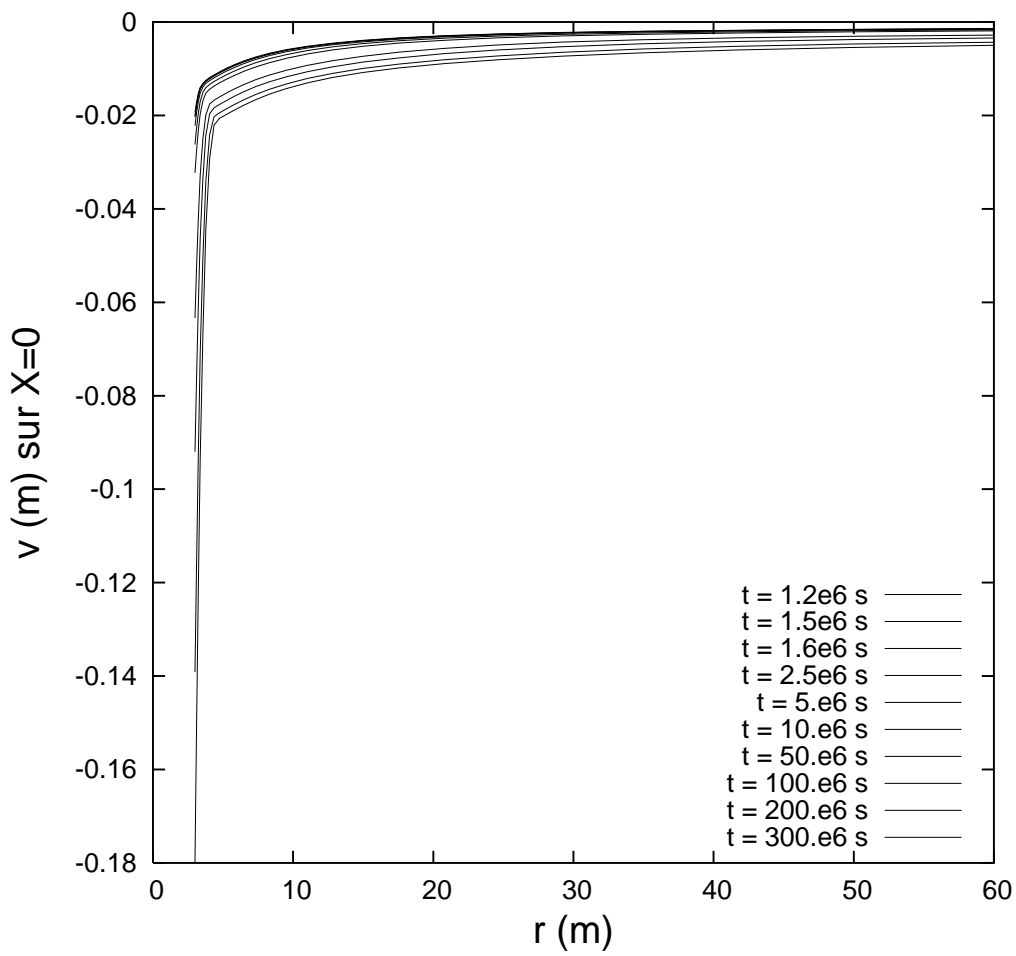
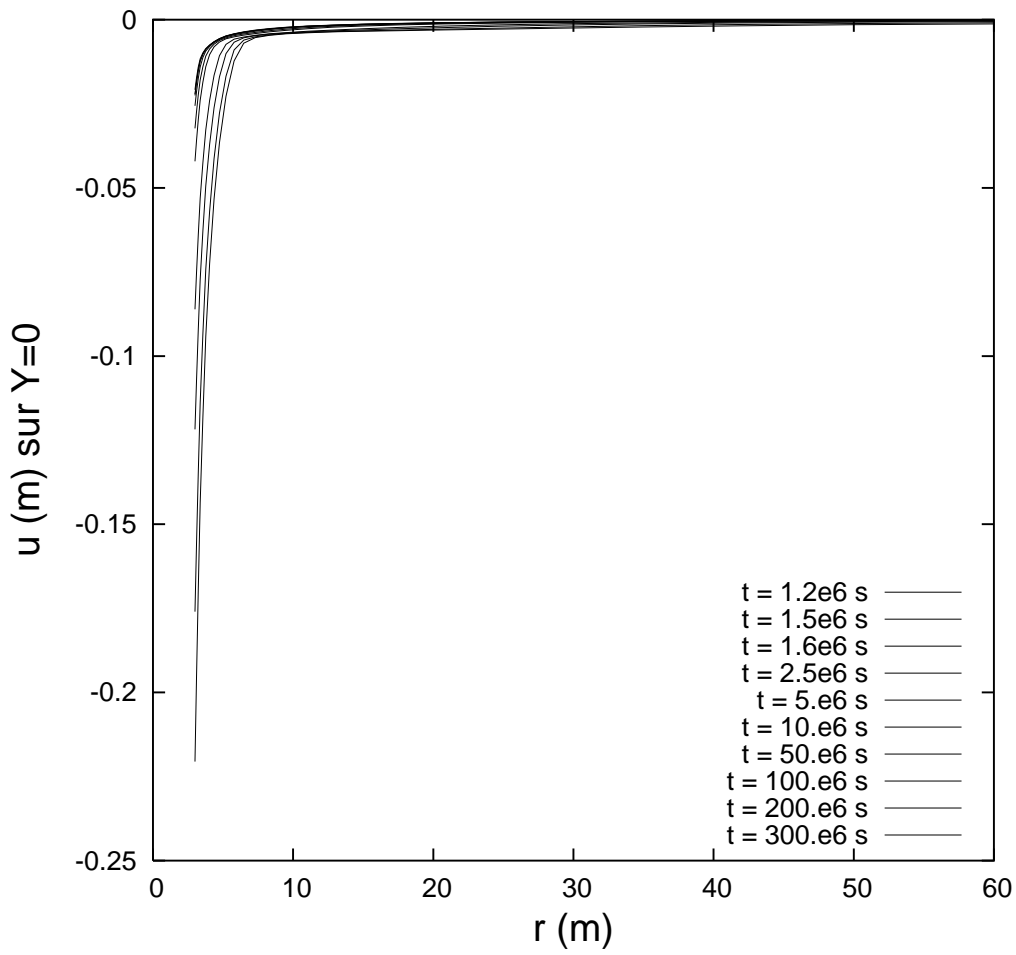


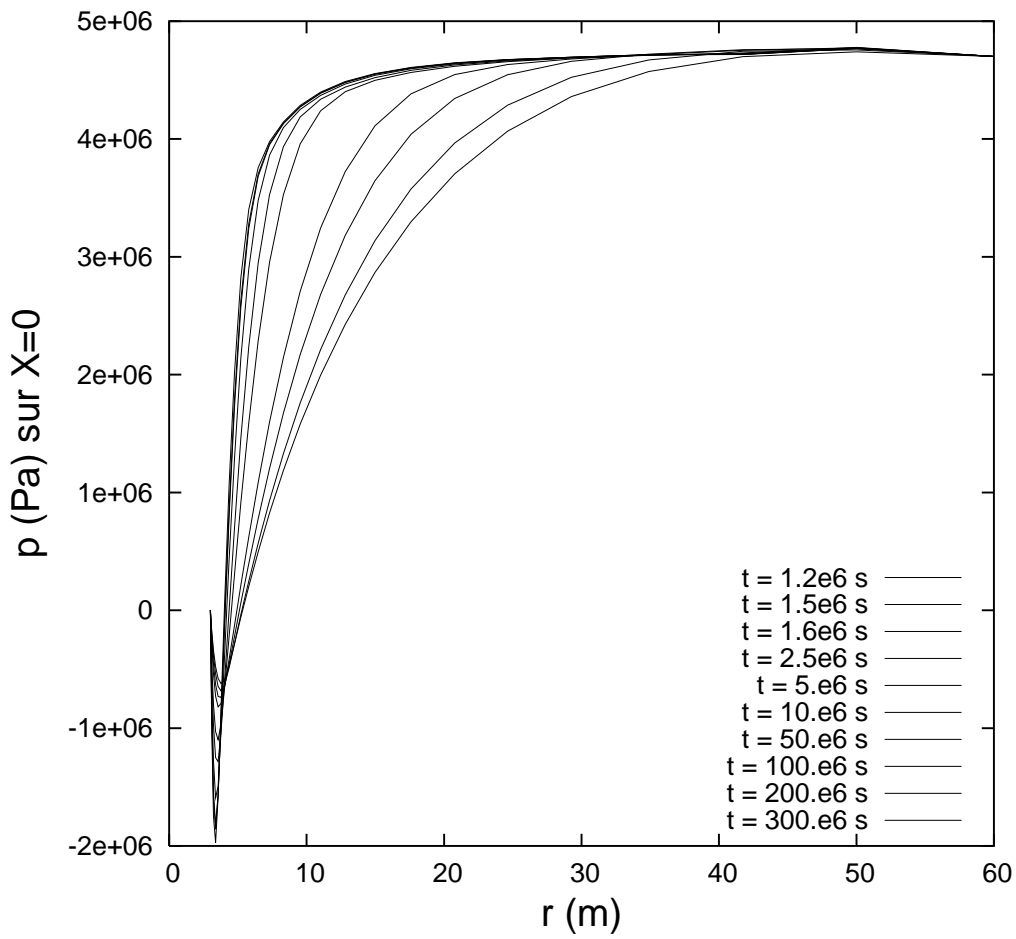
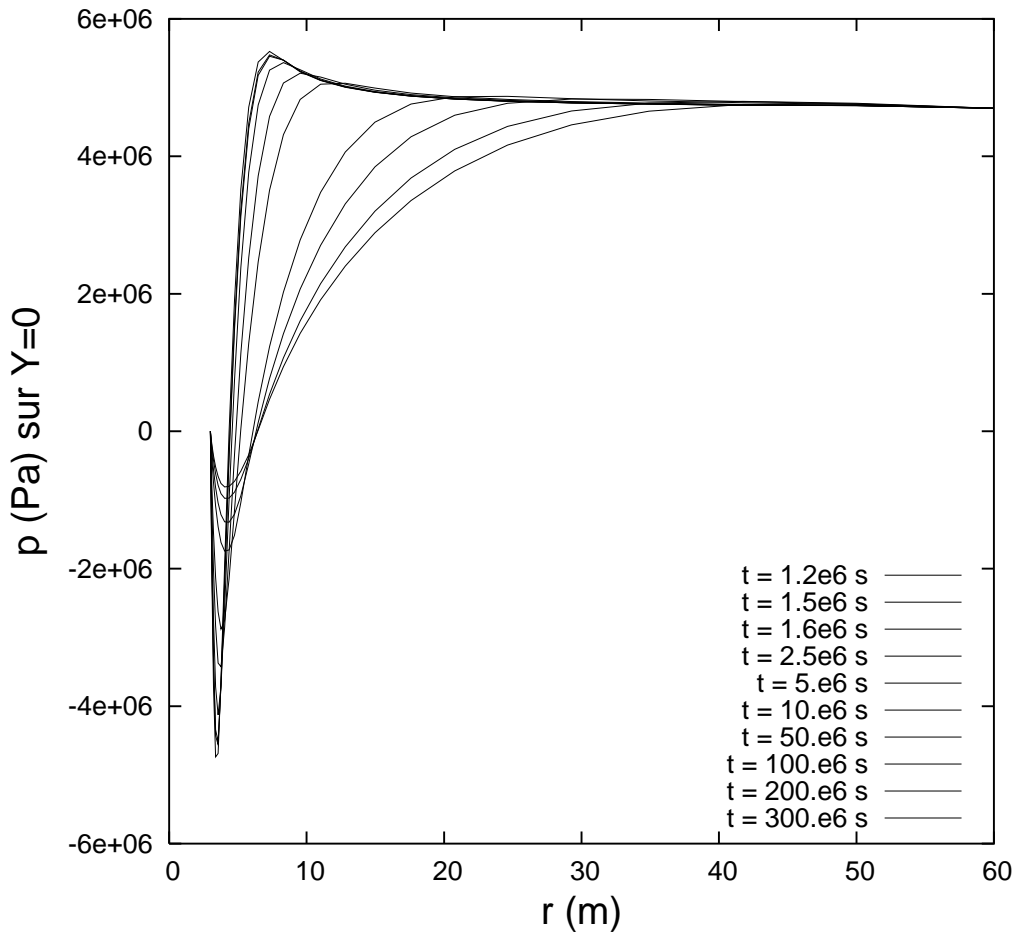


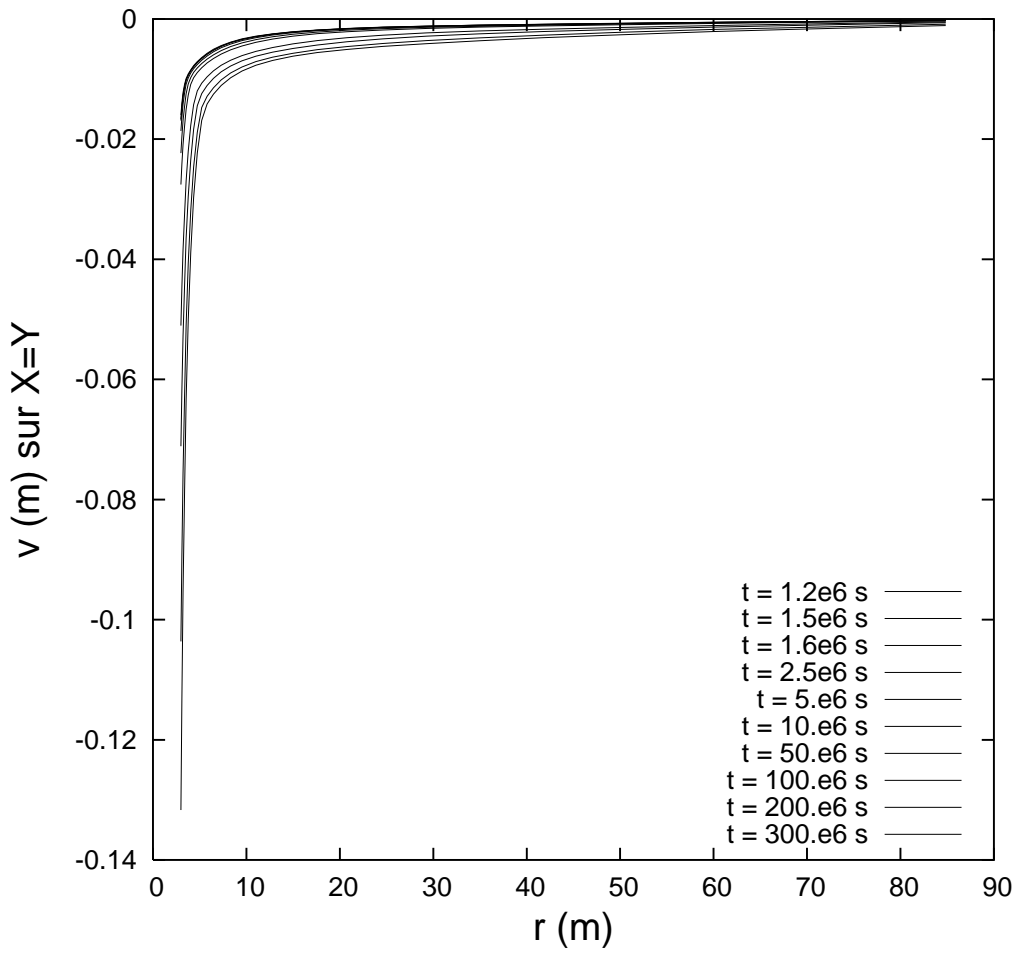
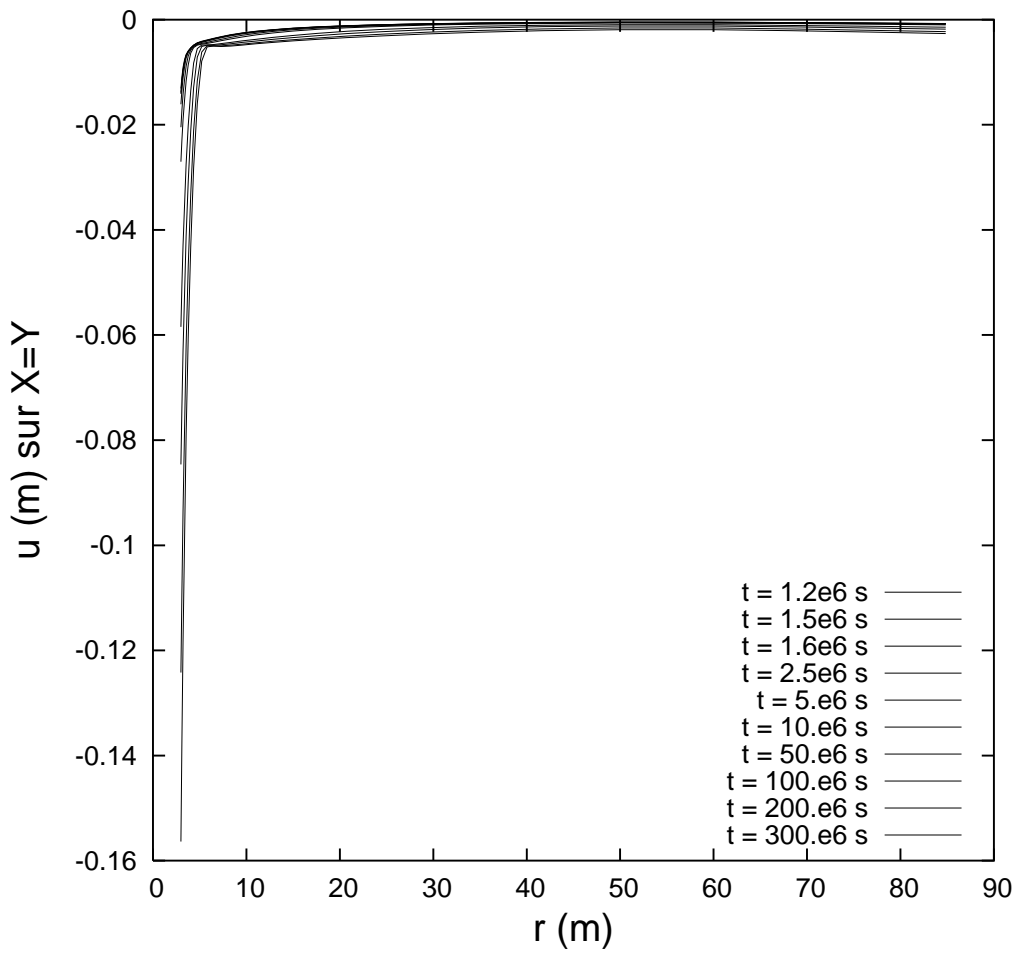


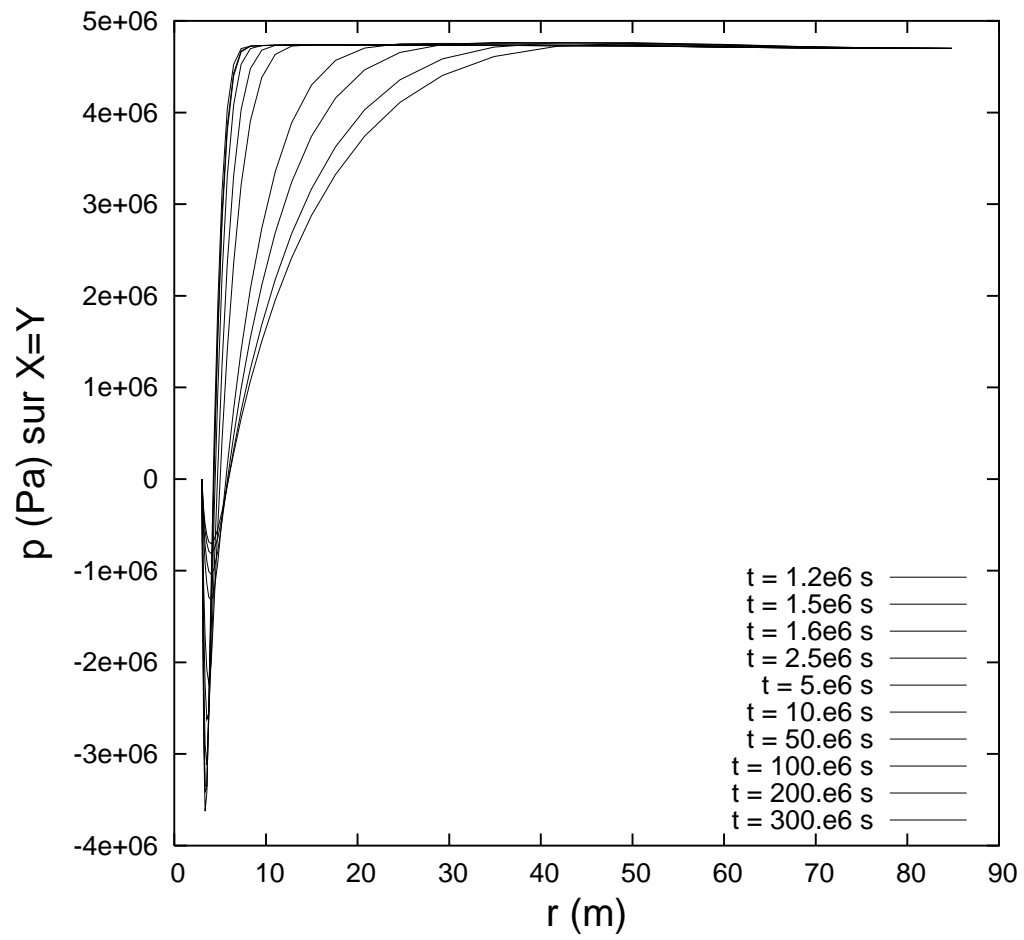
## Test2

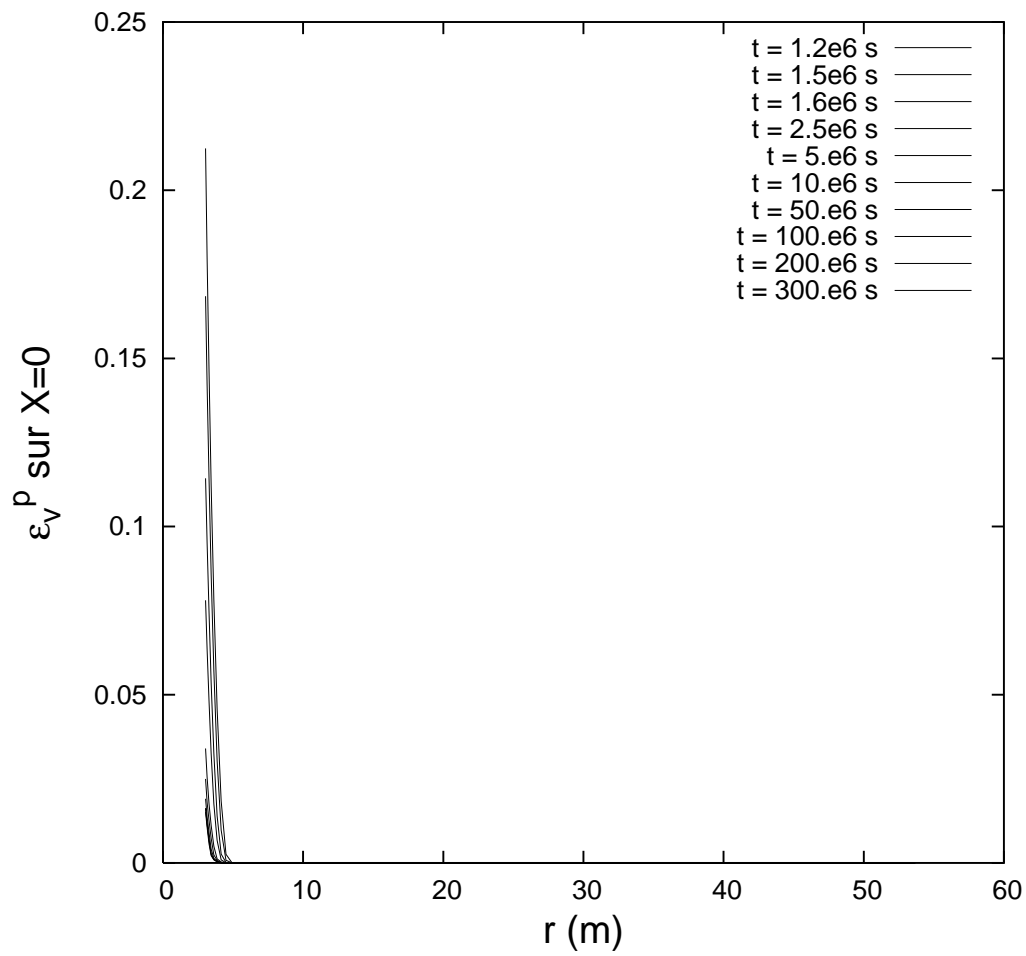
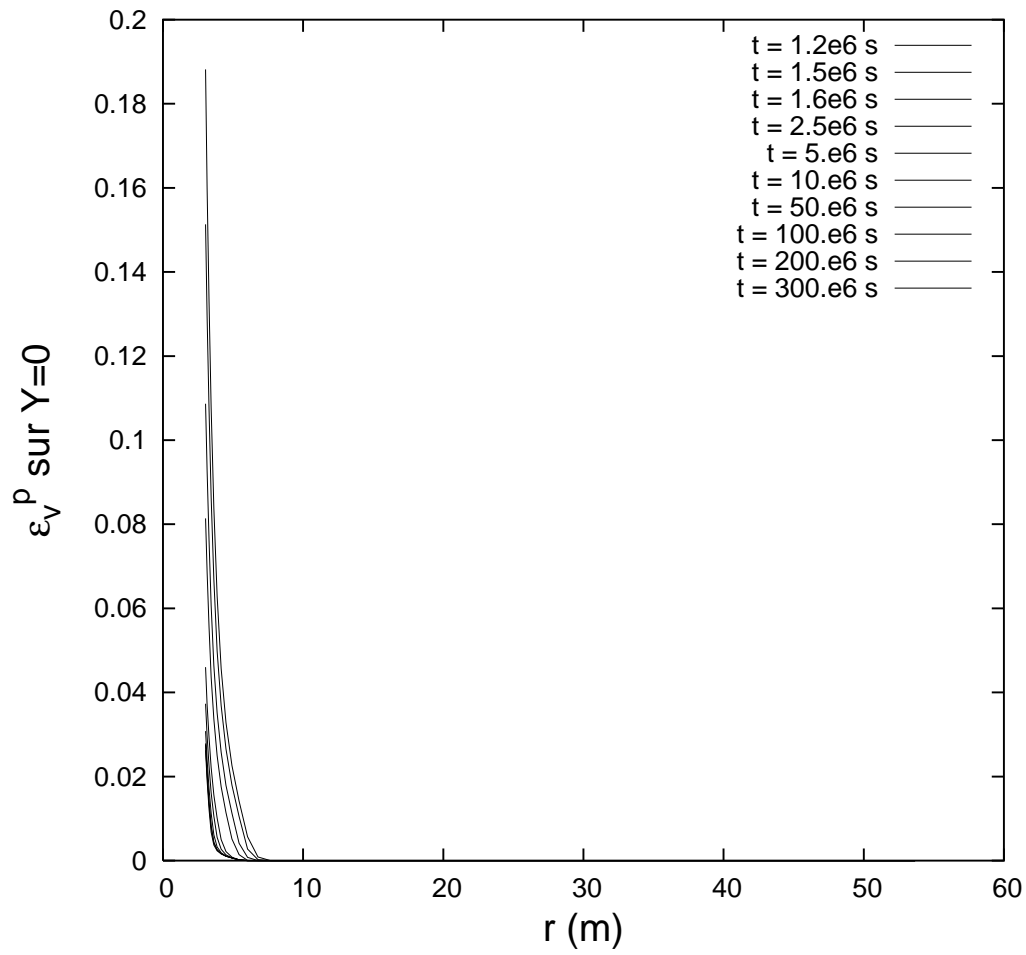
- 335 noeuds 334 éléments 2D (300 Q4 34 T3)
- 400 pas de temps de calcul
- critère de convergence :
  - $\frac{\delta u}{u_o} < 10^{-4}$  avec  $u_o = 10^{-3}$  m
  - $\frac{\delta v}{v_o} < 10^{-4}$  avec  $v_o = 10^{-3}$  m
  - $\frac{\delta p}{p_o} < 10^{-4}$  avec  $p_o = 10^5$  Pa
- 50 itérations pour  $\Delta t = 2.10^6$  s

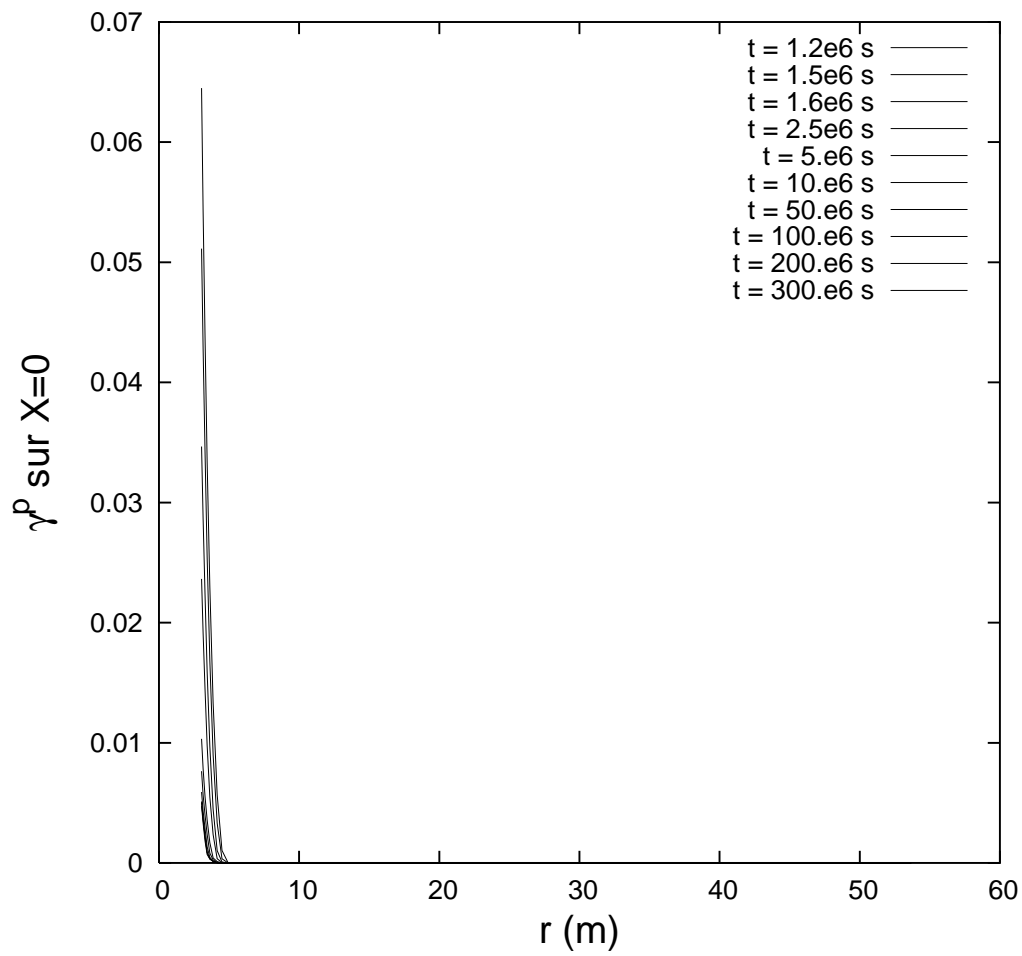
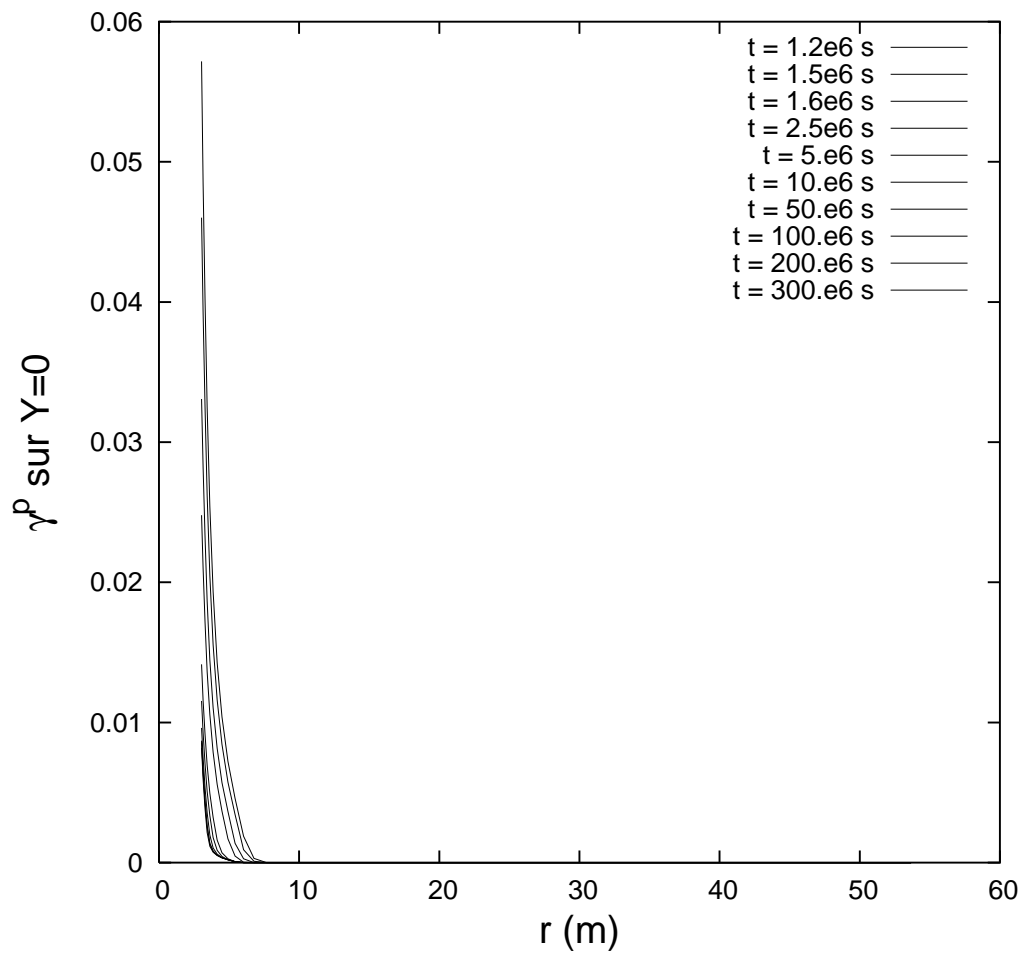


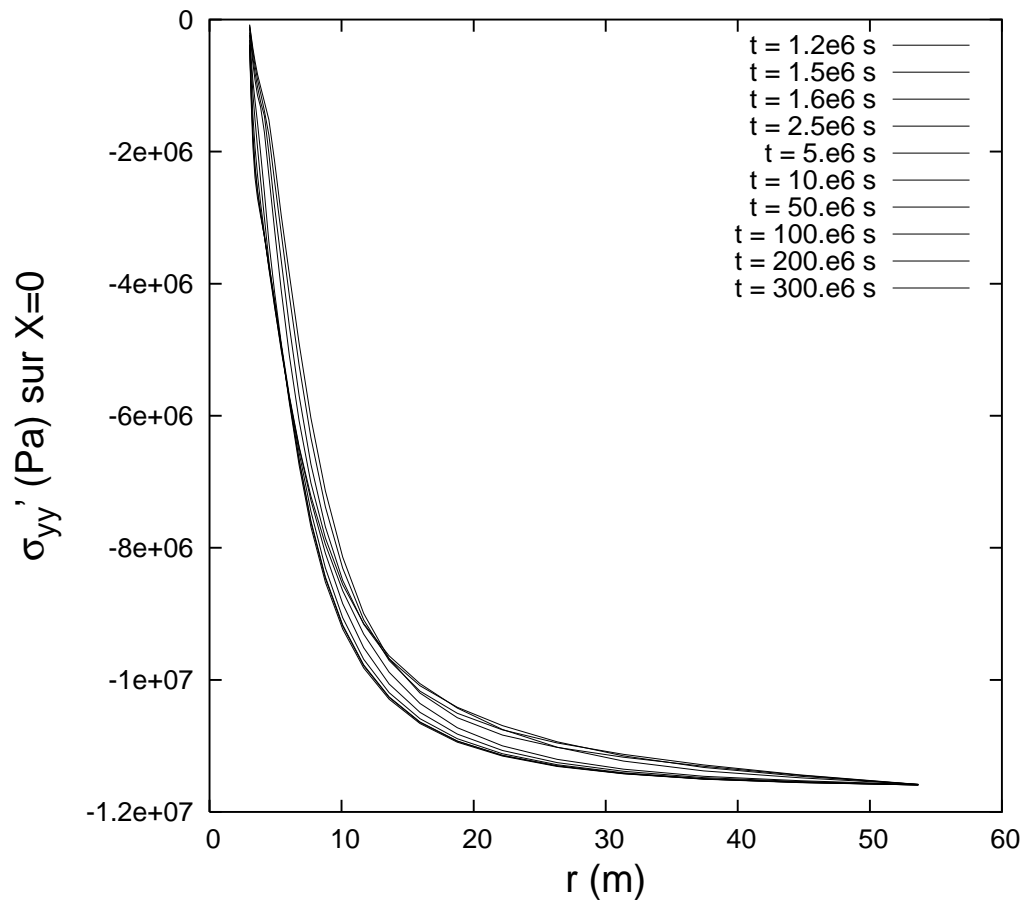
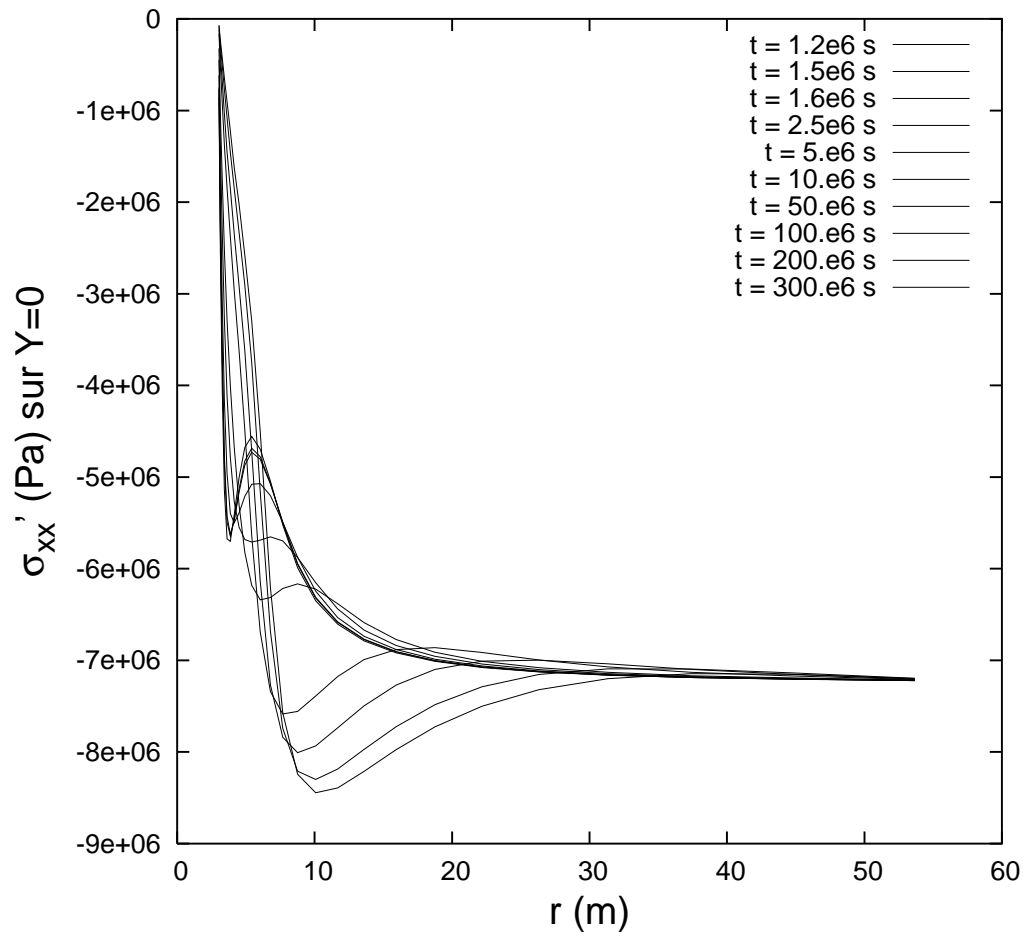


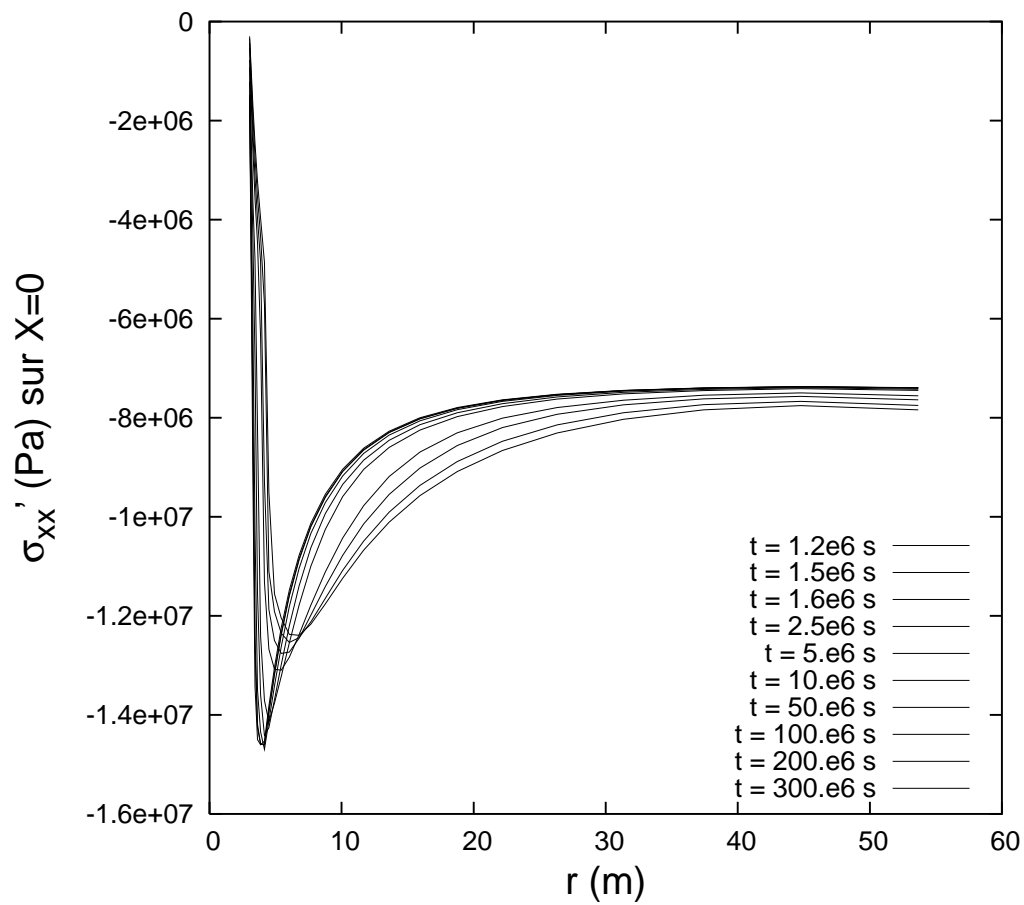
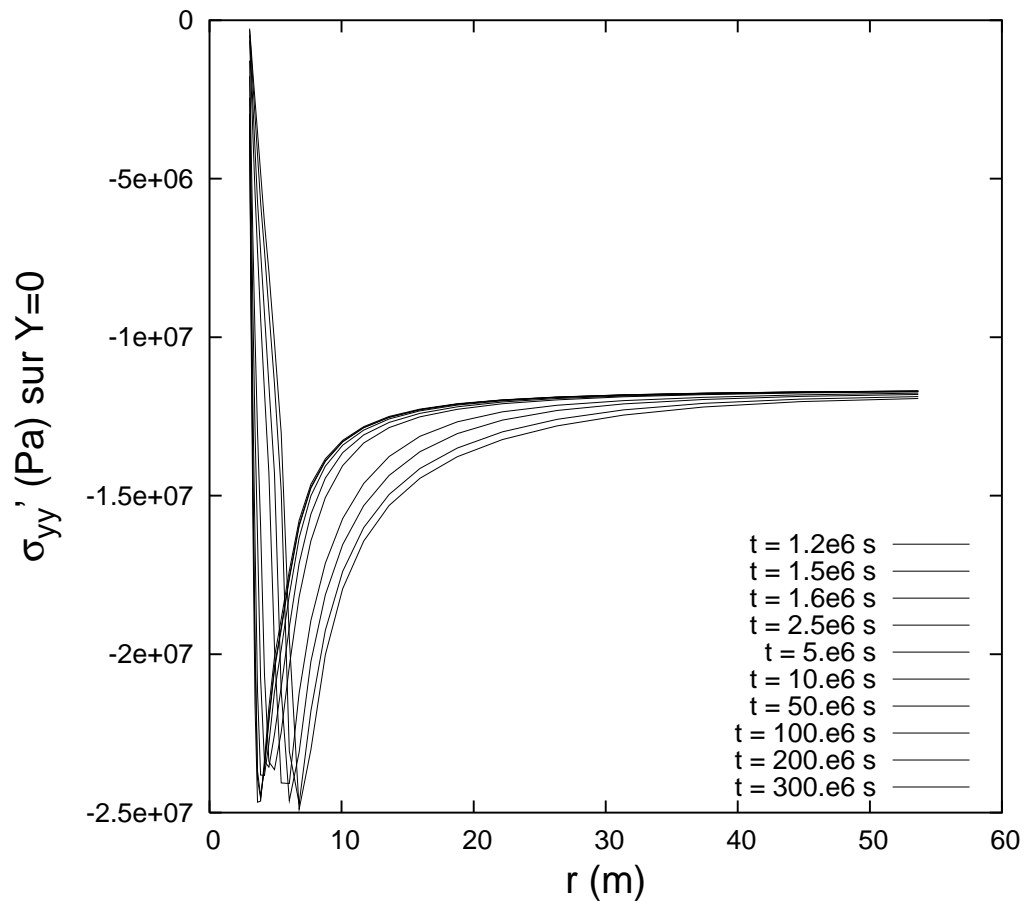


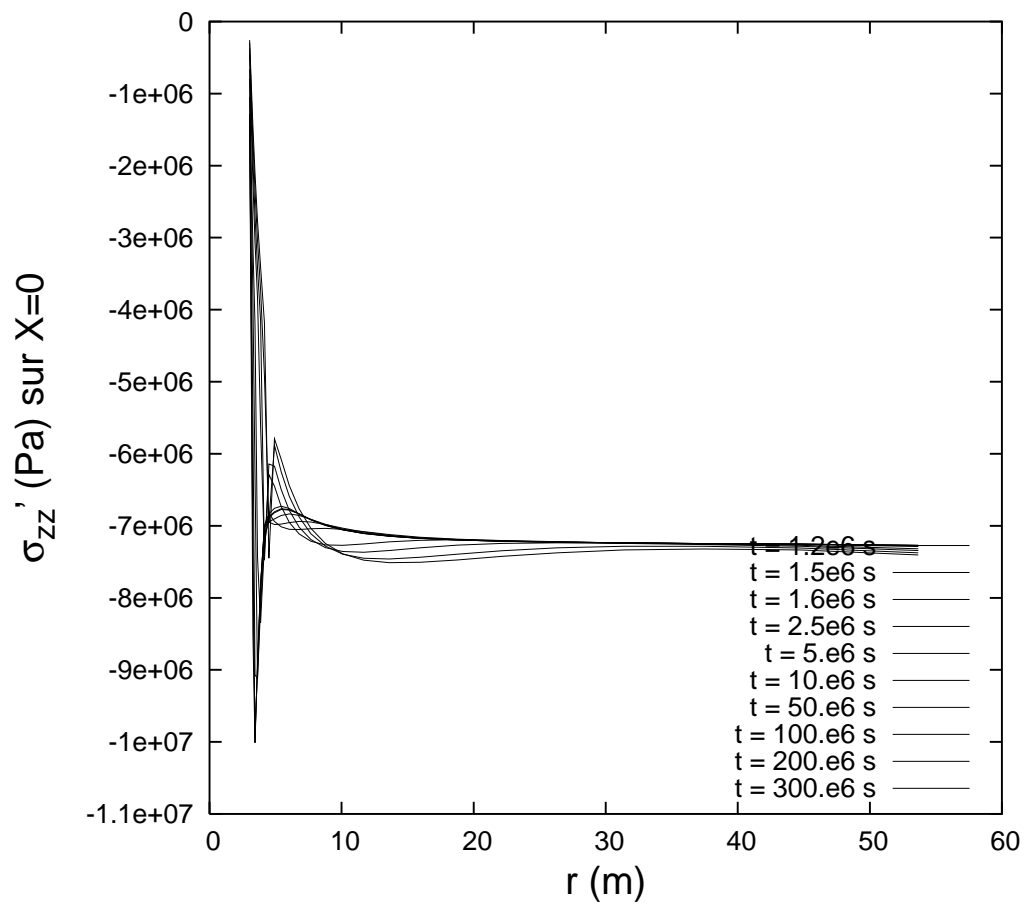
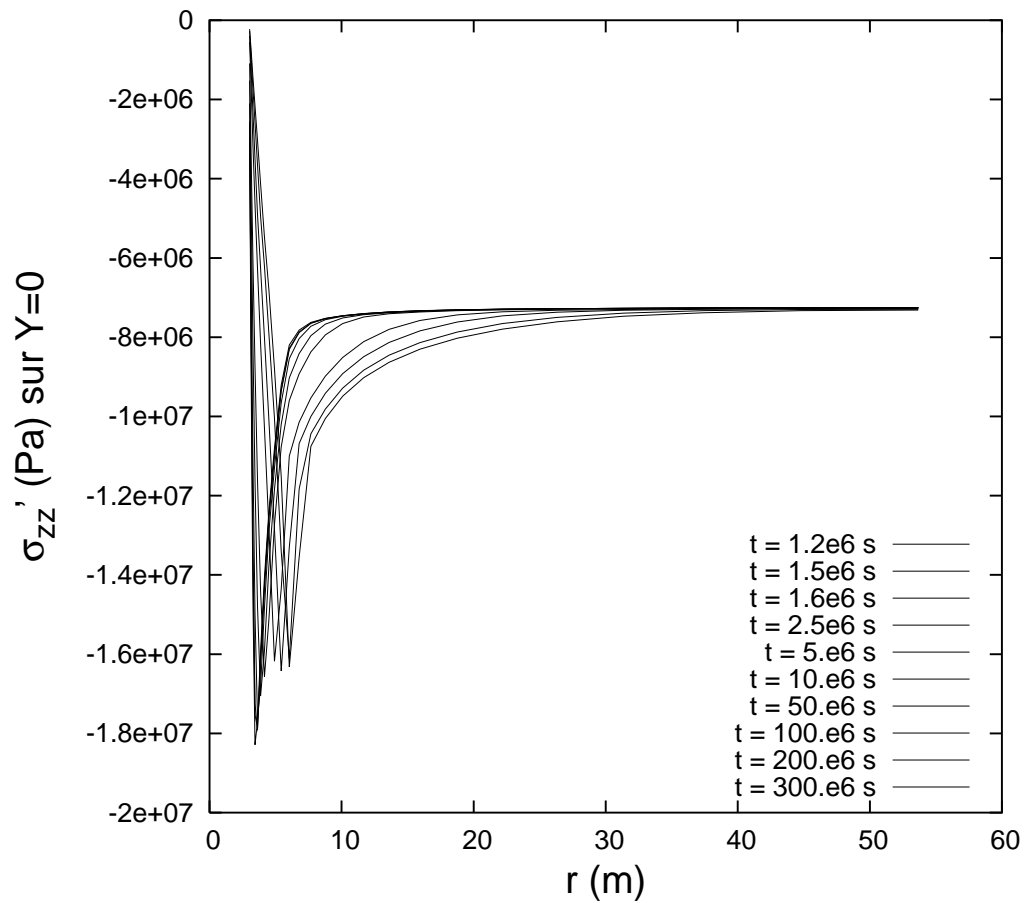












## Le code BIL

### quelques caractéristiques

- Pas de temps adaptatif  $\Delta t_{n+1} = \Delta t_n \frac{v_0}{\Delta v_n}$
- Gestion des interruptions de calcul
- Algorithme de Newton (matrice tangente)
- Calculs 1D, 2D, 3D
- Assemblage et résolution du système couplé complet
- Résolution par la méthode de Crout
- Langage C