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Title: The finite deformation dynamic sphere test problem

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The finite deformation dynamic sphere test problem

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1 Introduction

In this manuscript we describe test cases for the dynamic sphere problem in presence of finite deformations (refer to [1] for a detailed explanation of the problem and the solution strategy). The spherical shell in exam is made of a homogeneous, isotropic or transverse isotropic material and elastic and elastic-plastic material behaviors are considered. Twenty cases, (a) to (t), are thus defined combining material types and boundary conditions.

The inner surface radius, the outer surface radius and the material's density are kept constant for all the considered test cases and their values are $r_i = 10\text{mm}$, $r_o = 20\text{mm}$ and $\rho = 1000\text{Kg/m}^3$ respectively (equal to the values used in [2, 3]).

2 Boundary conditions

Jump and smooth jump boundary conditions are considered for the outer surface of the shell whereas the inner surface is traction-free [2, 3]. For jump boundary conditions, the stress at the outer surface is suddenly increased at time $t = 0$ from 0 to a nonzero constant and maintained at this level throughout the analysis. The impulse boundary pressure has the form

$$p(t) = a,$$

for all $t > 0$, where a is a constant. For smooth jump boundary conditions, the pressure on the outer surface is a smooth approximation of a discontinuous jump and is given by

$$p(t) = a \exp\left(\alpha\gamma\frac{(t-\beta)}{\beta}\right)\left(b + c\tanh\left(\frac{\gamma(t-\beta)}{\beta}\right)\right) + d\,t + e,$$

where a, b, c, d, e, β, γ and α are constant parameters. The values for the constant a, as well as the final time of the analysis, are given in Table 1 for the two considered types of boundary conditions. The remaining coefficients for the smooth jump boundary condition are listed in Table 2.

For consistency, the types of boundary conditions and materials used for cases (a) to (f) in the present report correspond to those employed for cases (a) to (f) in [2]. Nonetheless, it should be remarked that the magnitude of the applied loads is bigger, in this exercise, because the ultimate goal is to obtain large deformations. Furthermore, cases (k) and (l) in the present paper are identical to cases (a) and (c) in [3]; although cases (k), (l), (q) and (r) may be classified as small deformation cases, they are solved using the finite deformations code.

Case	Outer surface BC	a[GPa]	Final time[μs]
(a)	Jump	-5	5
(b)	Jump	-20	5
(c)	Smooth jump	-2	5
(d)	Smooth jump	-10	5
(e)	Smooth jump	-10	5
(f)	Smooth jump	-7	5
(g)	Jump	-1	5
(h)	Jump	-20	5
(i)	Smooth jump	-1.5	5
(j)	Smooth jump	-10	5
(k)	Smooth jump	-0.05	2.2
(l)	Smooth jump	-0.05	2.2
(m)	Smooth jump	-2	5
(n)	Smooth jump	-10	5
(o)	Smooth jump	-1	5
(p)	Smooth jump	-1	5
(q)	Smooth jump	-0.05	5
(r)	Smooth jump	-0.05	5
(s)	Smooth jump	-10	5
(t)	Smooth jump	-10	5

Table 1: BC type, coefficient a and analysis time for each case.

b	1
c	1
d	34719.8658712244432536 Pa/s
e	0.001388794634848978 Pa
β	1×10^{-6} s
γ	12.5
α	0

Table 2: Coefficients for the smooth jump BC

3 Material constitutive models

In the finite strain setting, the state of deformation of a point is completely defined by the deformation gradient, $\boldsymbol{F}$. The right Cauchy-Green deformation tensor, $\boldsymbol{C}$, is [4]

$$\boldsymbol{C} = \boldsymbol{F}^T \boldsymbol{F},$$

and the Green-Lagrange strain tensor is given by

$$\boldsymbol{E} = \frac{1}{2}\left(\boldsymbol{C} - \boldsymbol{1}\right).$$

The determinant of the deformation gradient is $J = \det(\boldsymbol{F})$ and the isochoric right Cauchy-Green tensor is $\bar{\boldsymbol{C}} = J^{-\frac{2}{3}}\boldsymbol{C}$.

Three constitutive models are considered: (i) linear elastic, (ii) elastic neo-hookean and (iii) elastic-plastic neo-hookean. The hyper-elastic constitutive models (neo-hookean) consider only isotropic materials whereas the linear elastic behavior accounts for transverse isotropy. Moreover, compressible and nearly incompressible ($\nu = 0.499999995$) material behaviors are considered. See Table 3 for a summary of the material models and Table 4 for the material parameters employed for each case.

In the linear elastic material (Cases (a) to (f) and (q) to (r)), the second Piola–Kirchhoff stress tensor, $\boldsymbol{S}$, is obtained from the Green–Lagrange strain tensor

$$\boldsymbol{S} = \mathbb{C}\boldsymbol{E},$$

or in components

$$\begin{Bmatrix} S_{rr} \\ S_{\theta\theta} \\ S_{\phi\phi} \end{Bmatrix} = \begin{bmatrix} \mathbb{C}_{rrrr} & \mathbb{C}_{rr\theta\theta} & \mathbb{C}_{rr\theta\theta} \\ \mathbb{C}_{rr\theta\theta} & \mathbb{C}_{\theta\theta\theta\theta} & \mathbb{C}_{\theta\theta\phi\phi} \\ \mathbb{C}_{rr\theta\theta} & \mathbb{C}_{\theta\theta\phi\phi} & \mathbb{C}_{\theta\theta\theta\theta} \end{bmatrix} \begin{Bmatrix} E_{rr} \\ E_{\theta\theta} \\ E_{\phi\phi} \end{Bmatrix},$$

where the coefficients of the $\mathbb{C}$ matrix are obtained following [2].

Along with the second Piola–Kirchhoff stress, the Kirchhoff stress, $\boldsymbol{\tau}$, and the Cauchy stress, $\boldsymbol{\sigma}$, are used in this manuscript. The Kirchhoff and the Cauchy stress measures are obtained from $\boldsymbol{S}$ according to

$$\boldsymbol{\tau} = \boldsymbol{F}\boldsymbol{S}\boldsymbol{F}^T,$$

and

$$\boldsymbol{\sigma} = \frac{1}{J}\boldsymbol{F}\boldsymbol{S}\boldsymbol{F}^T.$$

The stress for the hyper-elastic material (Case (g) to (p)) is obtained from the potential W as

$$\boldsymbol{S} = 2\frac{\partial W}{\partial \boldsymbol{C}},$$

where the considered potential is defined by

$$W = \frac{K}{2}\Big(J-1\Big)^2 + \frac{G}{2}\Big(Tr(\bar{\boldsymbol{C}}) - 3\Big),$$

with K and G respectively denoting bulk and shear moduli of the isotropic material (see Table 3).

Cases (g) to (j) deal with elastic material behavior whereas elastic-plastic material behavior (J2 plasticity) is considered in cases (k) to (p). For the latter category of material behavior, a multiplicative decomposition of the deformation gradient is employed

$$\boldsymbol{F} = \boldsymbol{F}_e \boldsymbol{F}_p,$$

where $\boldsymbol{F}_e$ and $\boldsymbol{F}_p$ identify the elastic and plastic part of the deformation gradient [5]. The yield surface, f, is

$$||\text{dev}(\boldsymbol{\tau})|| - (Y + H\alpha) \leq 0,$$

where $\text{dev}(\boldsymbol{\tau})$ is the deviatoric part of the Kirchhoff stress, α is the equivalent plastic strain and the parameters Y and H are respectively the yield stress and the isotropic hardening modulus of the material (see Table 3) .

(a)	Linear Elastic	Isotropic	Nearly Incompressible
(b)	Linear Elastic	Isotropic	Compressible
(c)	Linear Elastic	Isotropic	Nearly Incompressible
(d)	Linear Elastic	Isotropic	Compressible
(e)	Linear Elastic	Transverse Isotropic	Compressible
(f)	Linear Elastic	Transverse Isotropic	Compressible
(g)	Neo-Hooke	Isotropic	Nearly Incompressible
(h)	Neo-Hooke	Isotropic	Compressible
(i)	Neo-Hooke	Isotropic	Nearly Incompressible
(j)	Neo-Hooke	Isotropic	Compressible
(k)	Neo-Hooke Plastic	Isotropic	Compressible
(l)	Neo-Hooke Plastic	Isotropic	Compressible
(m)	Neo-Hooke Plastic	Isotropic	Compressible
(n)	Neo-Hooke Plastic	Isotropic	Compressible
(o)	Neo-Hooke Plastic	Isotropic	Nearly Incompressible
(p)	Neo-Hooke Plastic	Isotropic	Nearly Incompressible
(q)	Linear Elastic	Transverse Isotropic	Compressible
(r)	Linear Elastic	Transverse Isotropic	Compressible
(s)	Linear Elastic	Transverse Isotropic	Compressible
(t)	Linear Elastic	Transverse Isotropic	Compressible

Table 3: Material constitutive models

4 Conclusions

Plots of displacements, Cauchy stresses and equivalent plastic are shown from Fig. 1 to Fig. 20 and values of relevant fields are given in Tables 5-24. Symbols r_0, r, u_r, σ_{rr}, $\sigma_{\theta\theta}$, and α are used to indicate position at $t = 0$, position at the

(1) Isotropic

Case	K [GPa]	G [GPa]	Y [MPa]	H [GPa]
(a)	100	1×10^{-6}	-	-
(b)	100	60	-	-
(c)	100	1×10^{-6}	-	-
(d)	100	60	-	-
(g)	100	1×10^{-6}	-	-
(h)	100	60	-	-
(i)	100	1×10^{-6}	-	-
(j)	100	60	-	-
(k)	4000/33	800/11	100	0
(l)	20000/99	4000/33	200	20000/99
(m)	4000/33	800/11	1000	0
(n)	20000/99	4000/33	1000	20000/99
(o)	100	1×10^{-6}	1×10^{-3}	0
(p)	100	1×10^{-6}	1×10^{-3}	1×10^{-6}

(2) Transversely isotropic, engineering constants

Case	E_{rr}[Gpa]	$E_{\theta\theta}$[Gpa]	$\nu_{r\theta}$	$\nu_{\theta\phi}$
(e)	150	100	0.25	0.25
(f)	100	150	0.25	0.25

(3) Transversely isotropic, $\mathbb{C}$ matrix

Case	$\mathbb{C}_{rrrr}$[Gpa]	$\mathbb{C}_{rr\theta\theta}$[Gpa]	$\mathbb{C}_{\theta\theta\theta\theta}$[Gpa]	$\mathbb{C}_{\theta\theta\phi\phi}$[Gpa]
(q)	336.43	14.0	292.30	26.69
(r)	291.85	27.85	291.85	27.85
(s)	336.43	14.0	292.30	26.69
(t)	291.85	27.85	291.85	27.85

Table 4: Material parameters

considered t, radial displacement, rr component of the Cauchy stress, $\theta\theta$ component of the Cauchy stress and equivalent plastic strain, respectively. Moreover, the following relation between displacement and position holds $r = r_0 + u_r$.

When jump boundary conditions are employed (cases (a), (b), (g) and (h)) the distribution of radial and tangential stresses as function of the radius may present some oscillations. These oscillations are due to the high-order interpolation of the displacement field (Gibbs phenomenon).

Finally, it is worth observing that nearly incompressible behavior for linear elastic materials yields to $S_{rr} \equiv S_{\theta\theta}$ which only assuming small deformation implies $\sigma_{rr} \equiv \sigma_{\theta\theta}$ as in [2]. Conversely, if nearly incompressible neo-hookean materials are employed the radial and tangential Cauchy stresses are always identical (see Cases (g), (i), (o), (p)). It should also be remarked that although

σ_{rr}, and sometimes also $\sigma_{\theta\theta}$, evaluated at the inner surface has to be null, the values of the Cauchy stress components for $r_0 = r_i$ listed in Tables 5-24 are, in general, different from zero. Nonetheless, their values are small and are due to machine precision errors.

Remark: all the dynamic sphere problems in the present report are solved using the finite deformation algorithm [1]. Due to the very small magnitude of the displacement field, cases (k), (l), (q) and (r) can be considered as small deformation cases: applying the small deformation methodology in [3] to those cases would lead to the same results shown hereafter. Moreover, cases (k) and (l) have already been shown in [3] and they are re-proposed in this manuscript for the sake of completeness.

References

[1] D. Versino and J. Brock, "Benchmark solution of the dynamic response of a spherical shell at finite strain," *Submitted to European Journal of Mechanics, A/Solids*, 2016.

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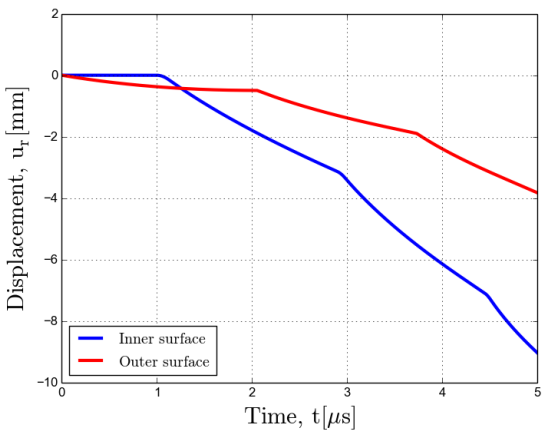
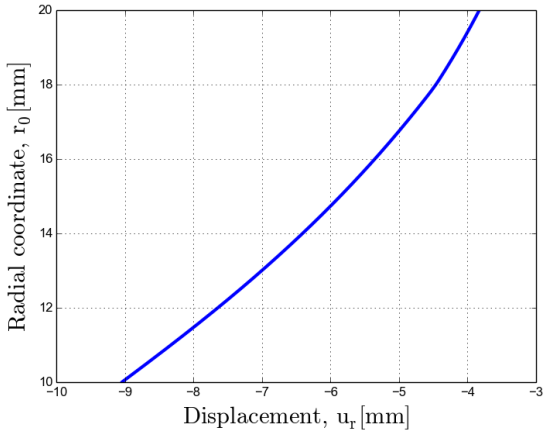
[3] B. Chabaud and J. Brock, "The rate-independent elastic-plastic dynamic sphere test problem," Tech. Rep. LA-UR-14-26608, 2014.

[4] L. Malvern, *Introduction to the Mechanics of a Continuous Medium*. Prentice-Hall, 1969.

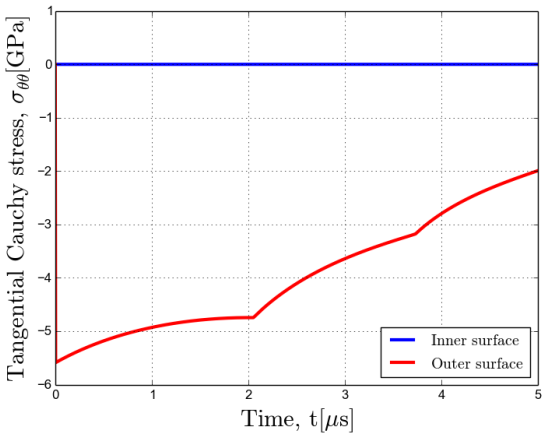
[5] J. Simo and T. Hughes, *Computational Inelasticity*. Springer New York, 1998.



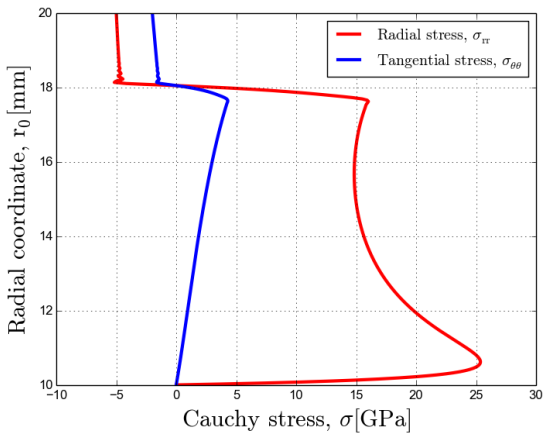
(a) u_r vs. t on boundaries



(b) u_r vs. r_0 at final time

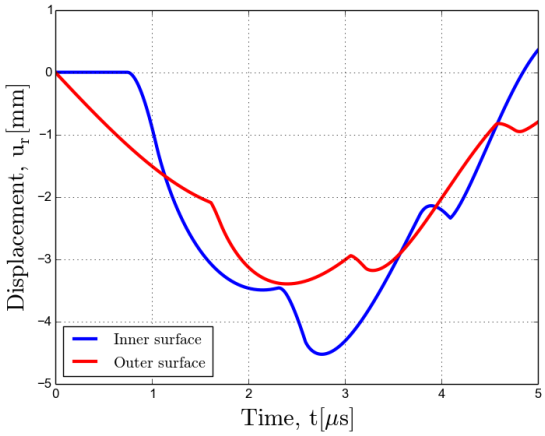


(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 1: Case (a).



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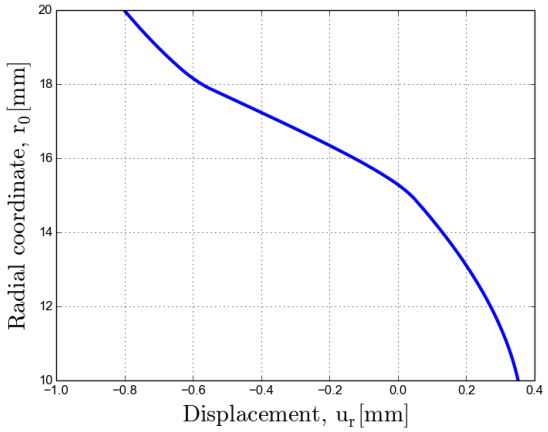
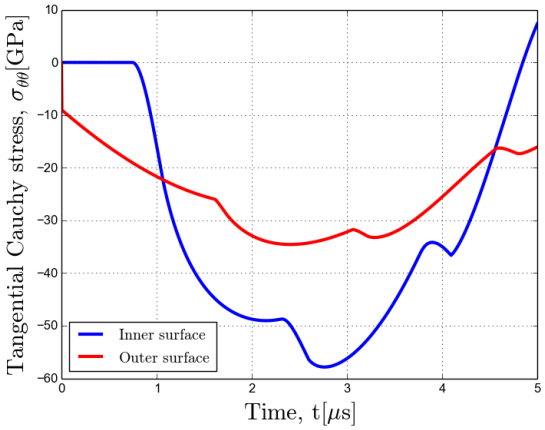
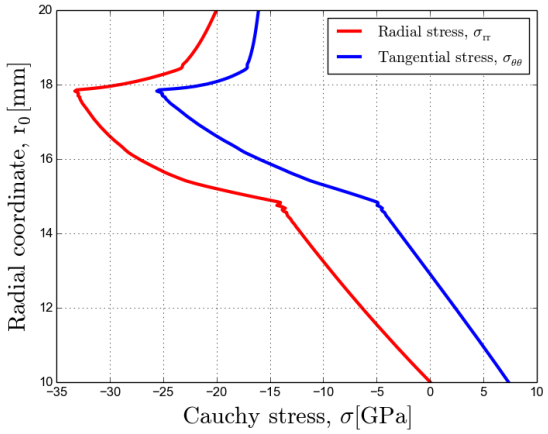


(b) u_r vs. r_0 at final time

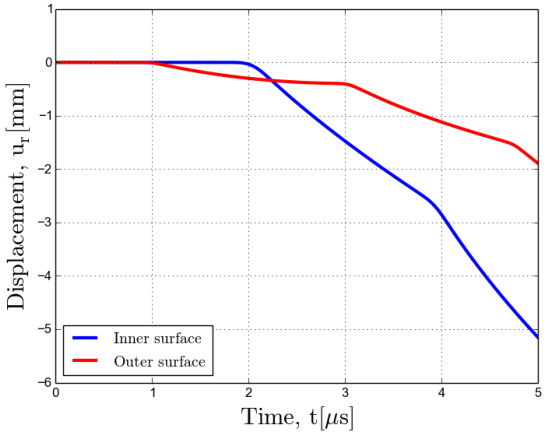


(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 2: Case (b).



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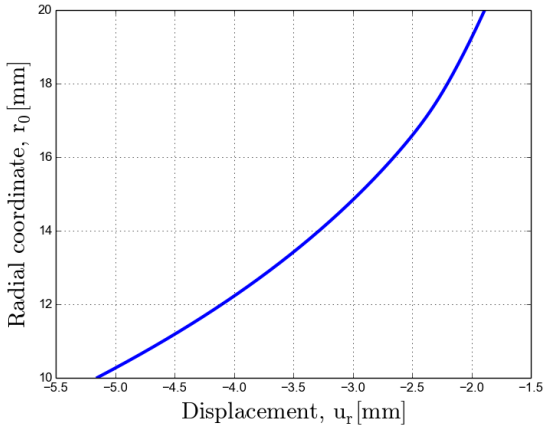
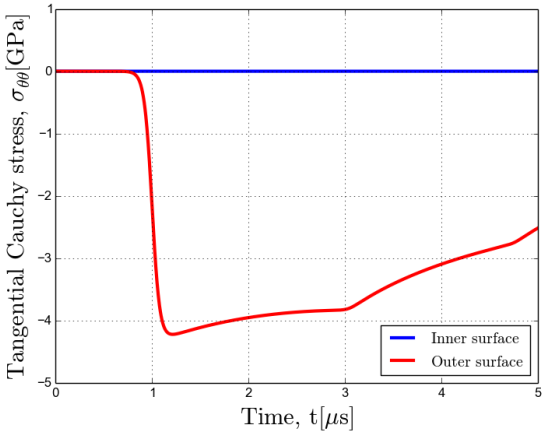
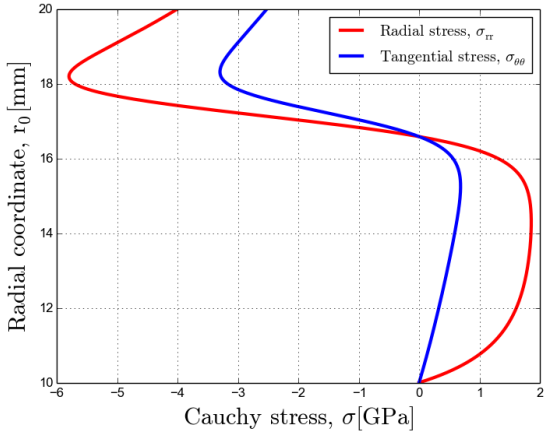


(b) u_r vs. r_0 at final time

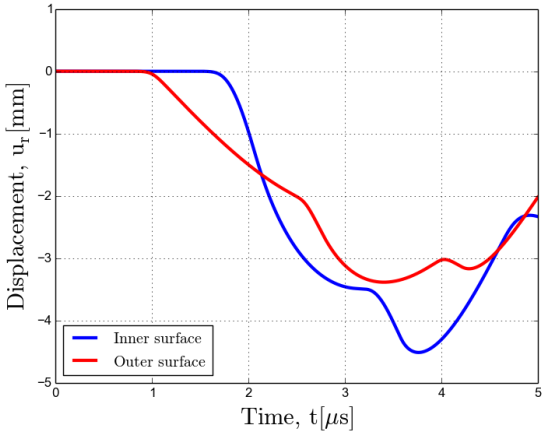


(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 3: Case (c).



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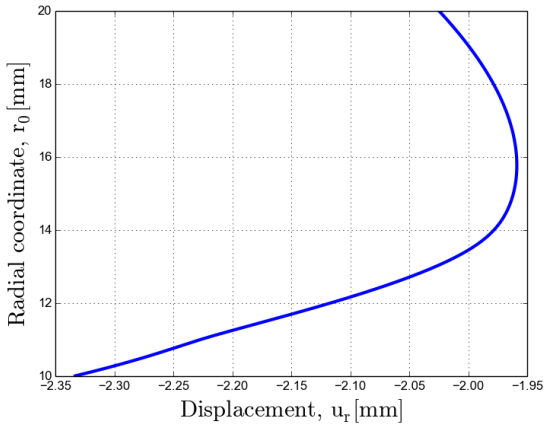

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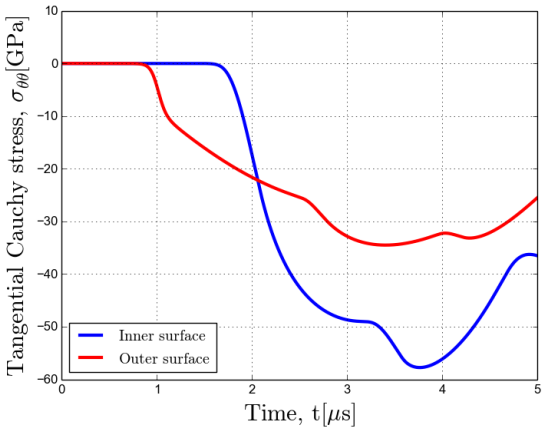
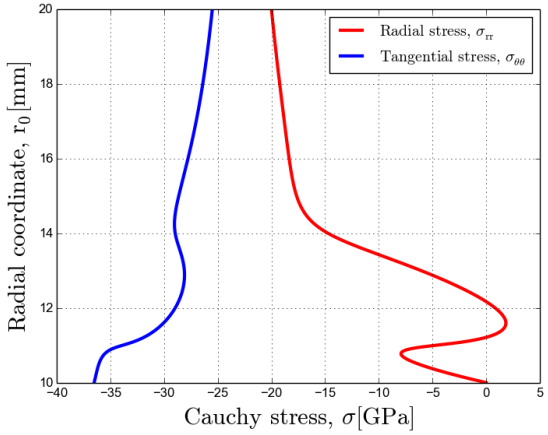
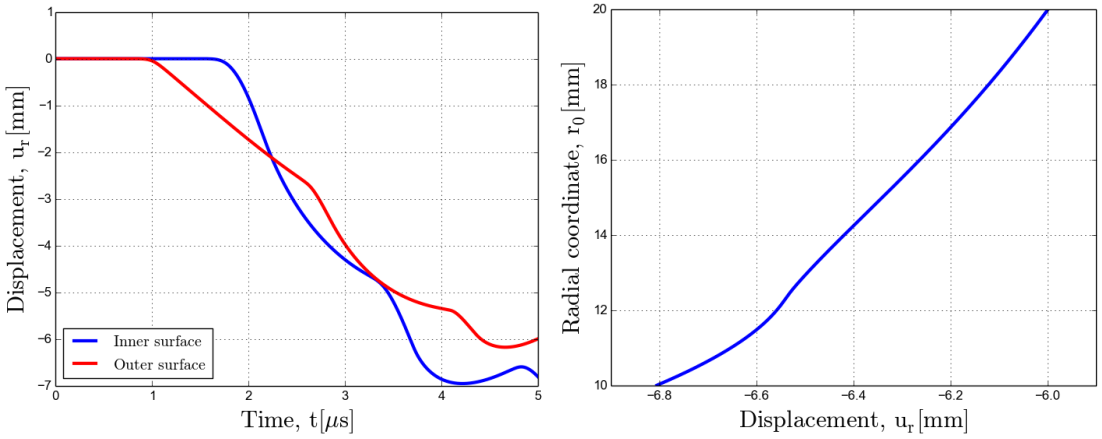


(c) $\sigma_{\theta\theta}$ vs. t on boundaries



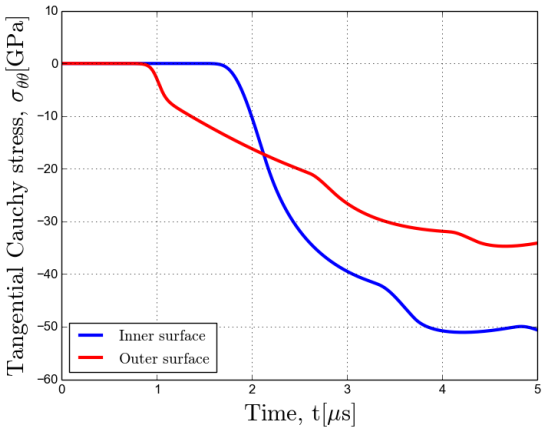
(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 4: Case (d).

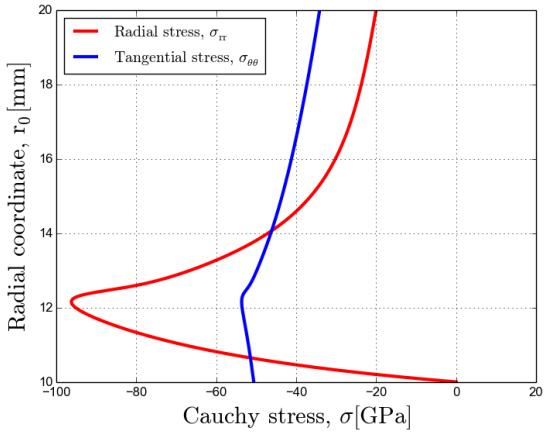


(a) u_r vs. t on boundaries

(b) u_r vs. r_0 at final time

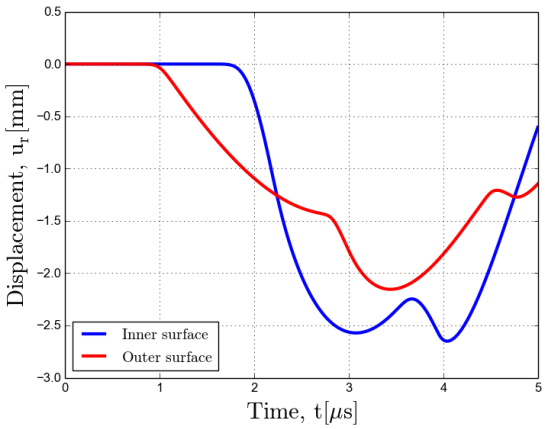


(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 5: Case (e).



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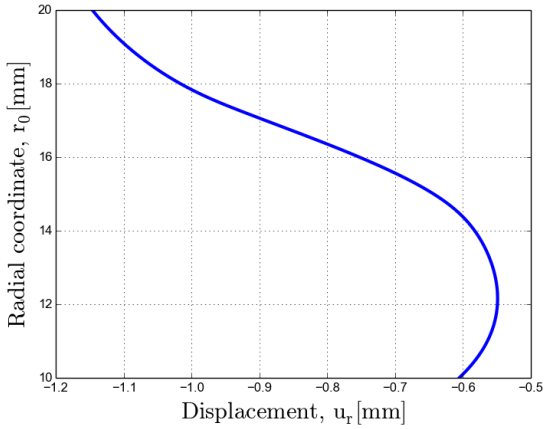

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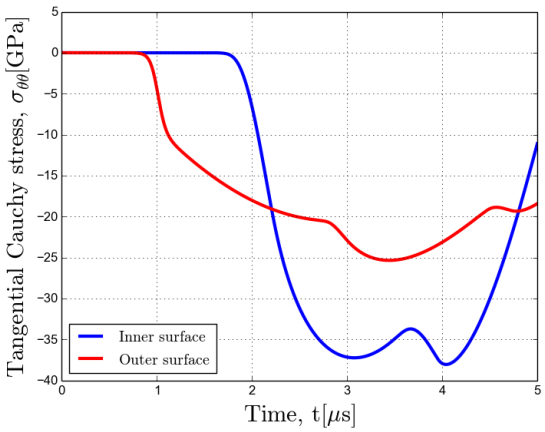
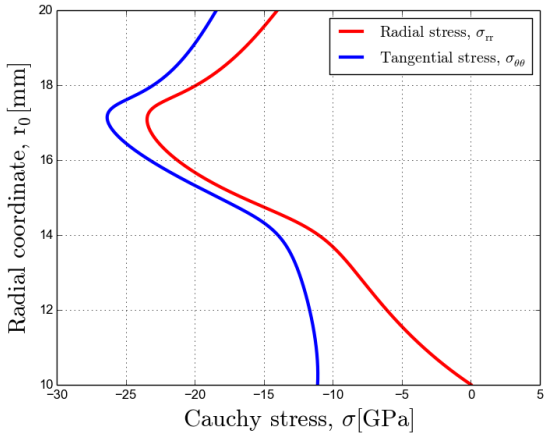
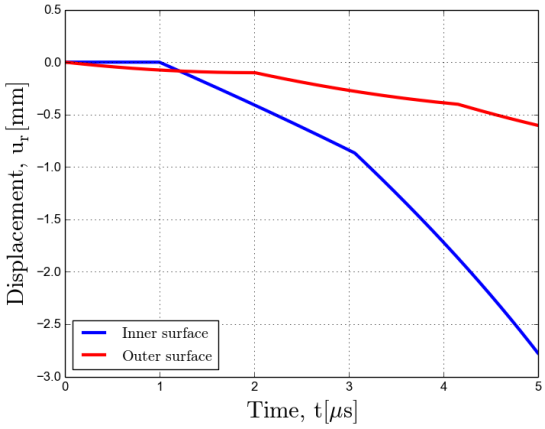


(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 6: Case (f).



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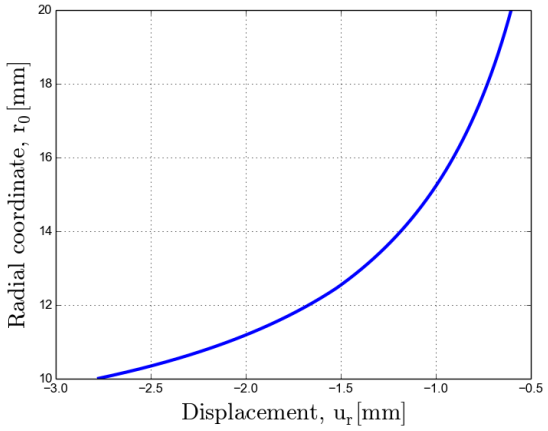

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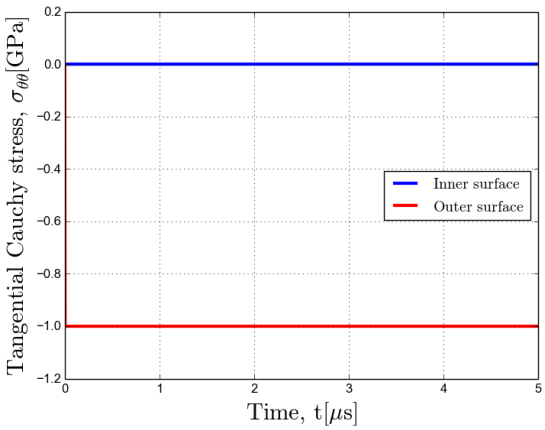
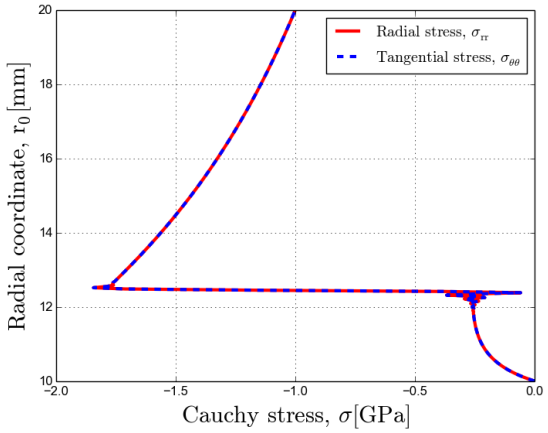
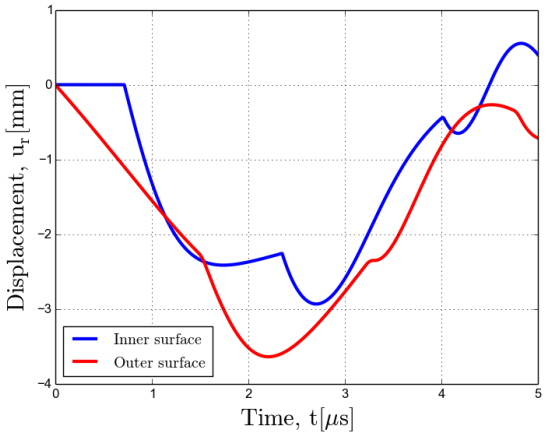


(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 7: Case (g).



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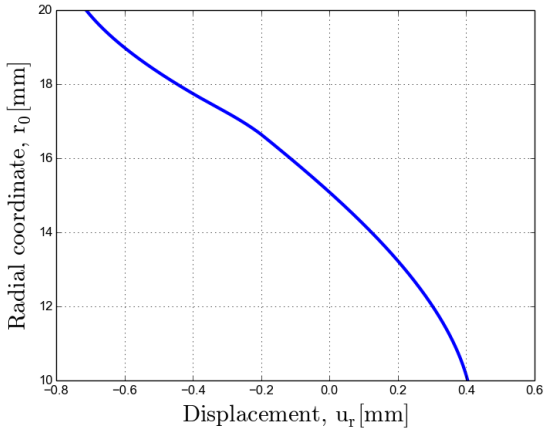

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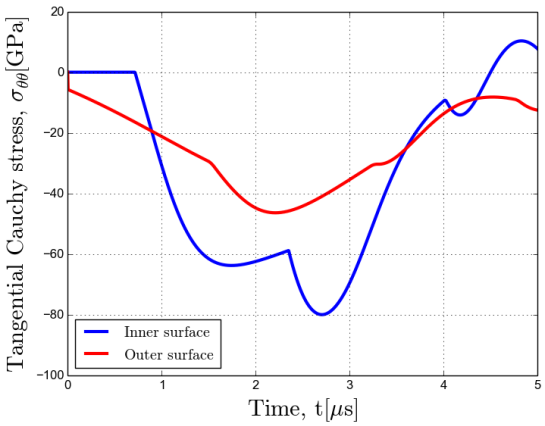
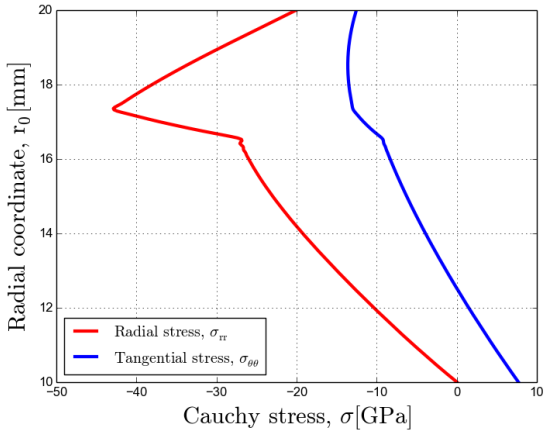
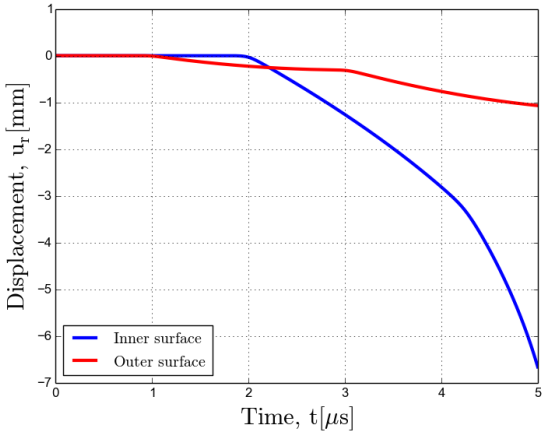


(c) $\sigma_{\theta\theta}$ vs. t on boundaries

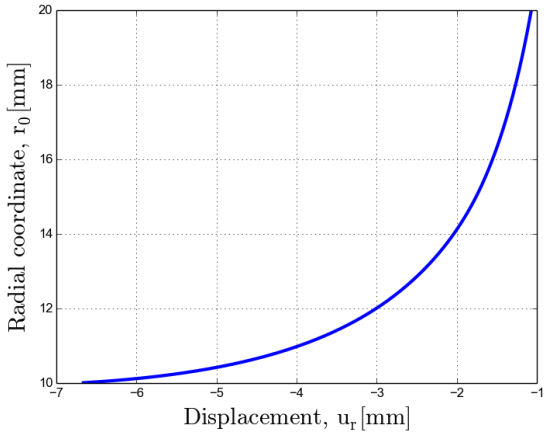


(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

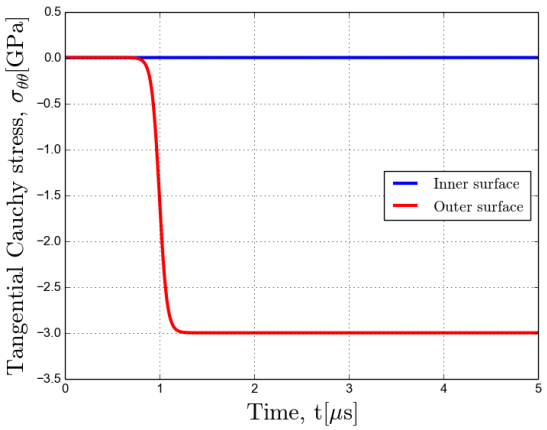
Figure 8: Case (h).



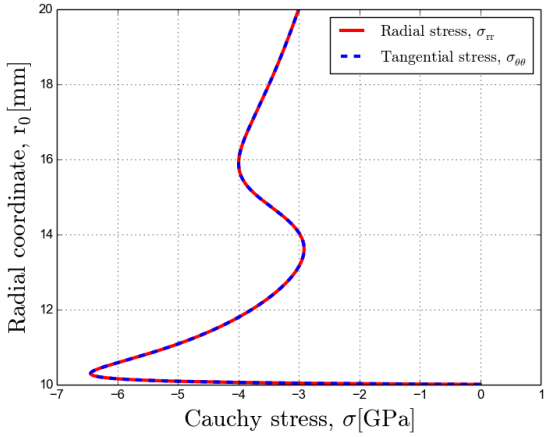
(a) u_r vs. t on boundaries



(b) u_r vs. r_0 at final time

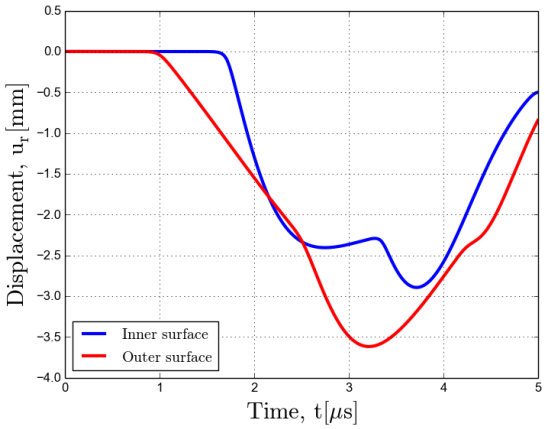


(c) $\sigma_{\theta\theta}$ vs. t on boundaries

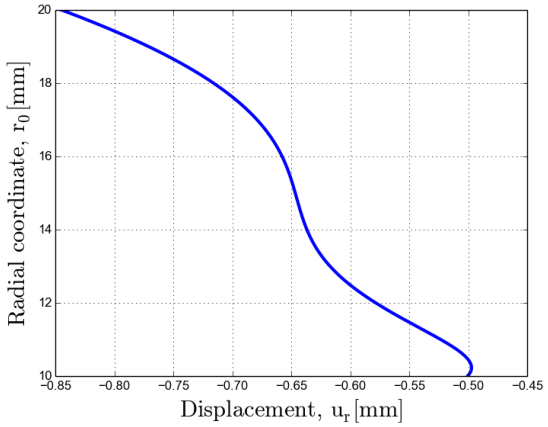


(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

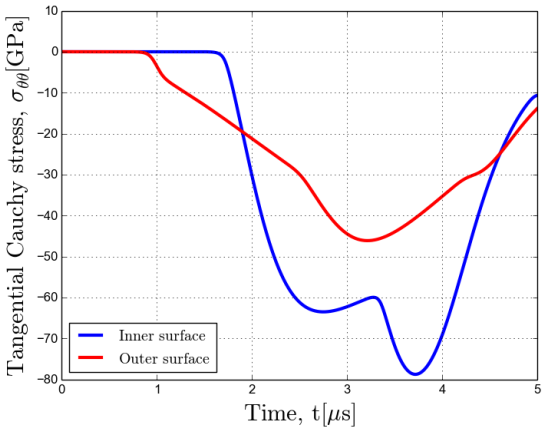
Figure 9: Case (i).



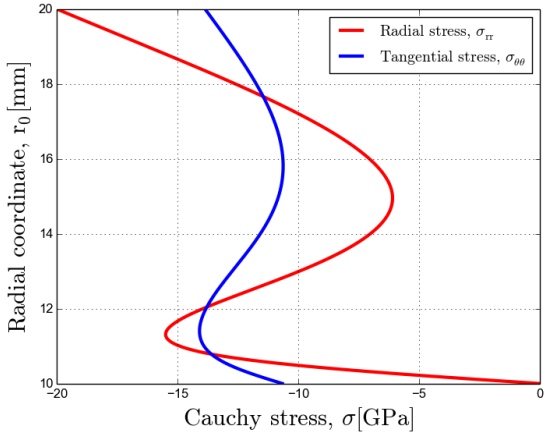
(a) u_r vs. t on boundaries



(b) u_r vs. r_0 at final time

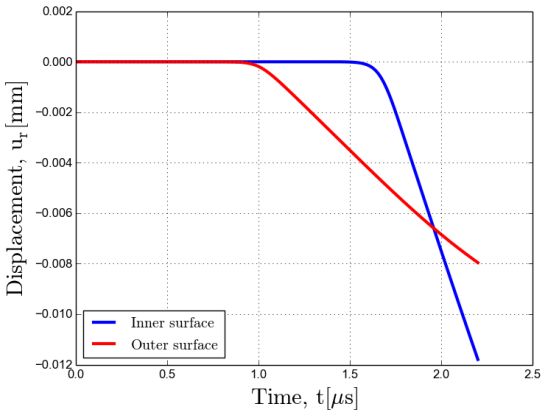


(c) $\sigma_{\theta\theta}$ vs. t on boundaries

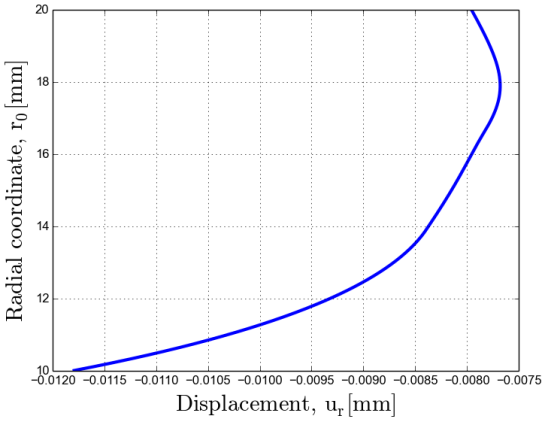


(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

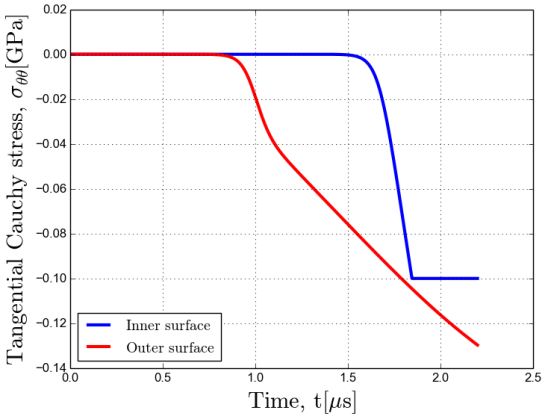
Figure 10: Case (j).



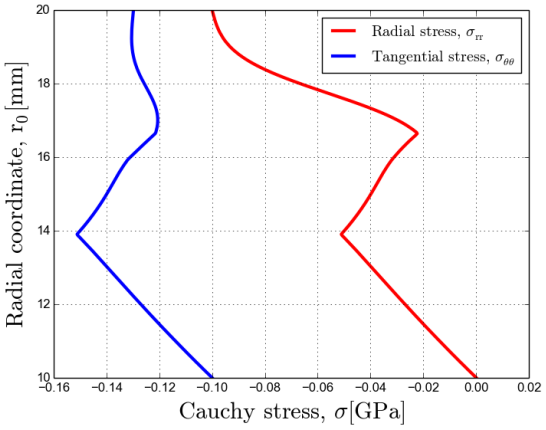
(a) u_r vs. t on boundaries



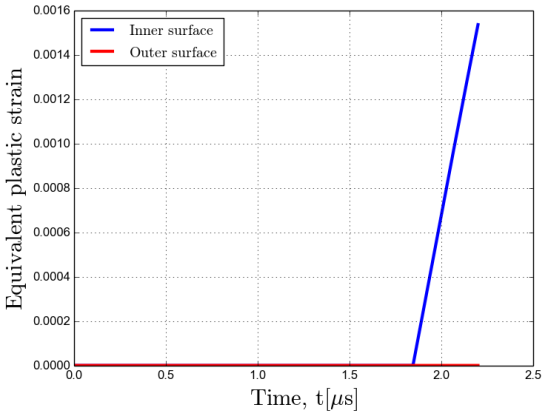
(b) u_r vs. r_0 at final time



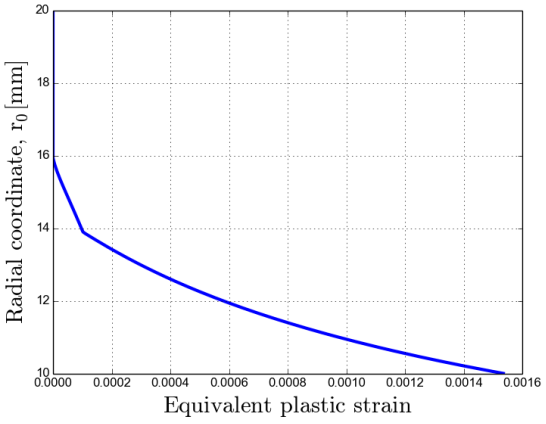
(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

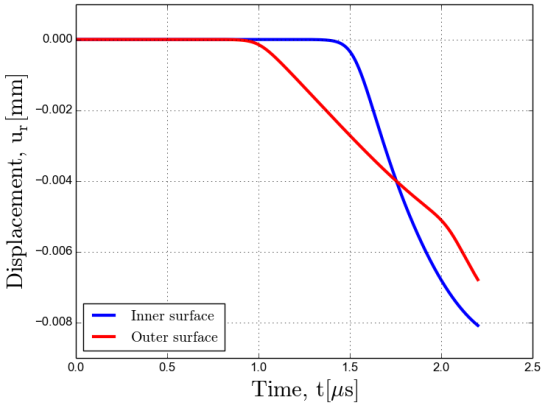


(e) α vs. t on boundaries

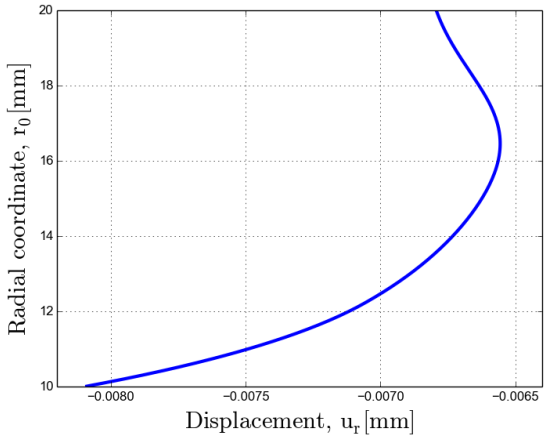


(f) α vs. r_0 at final time

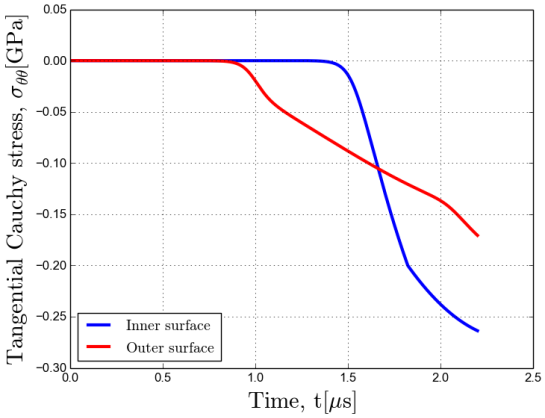
Figure 11: Case (k).



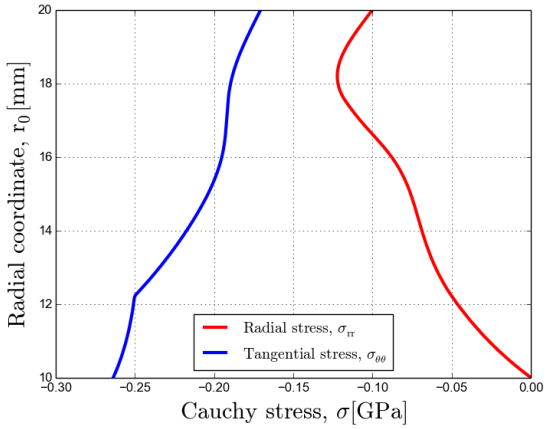
(a) u_r vs. t on boundaries



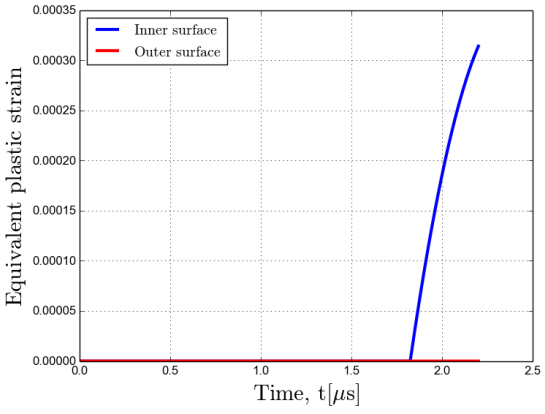
(b) u_r vs. r_0 at final time



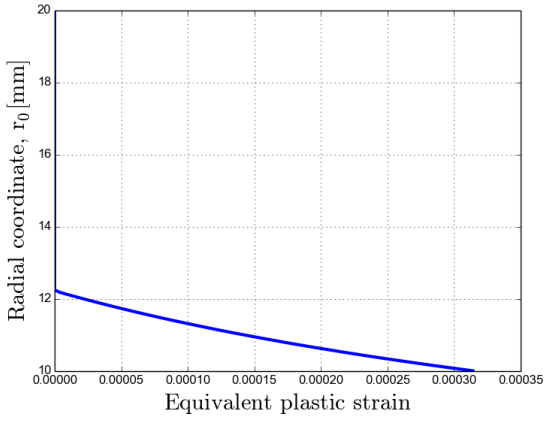
(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

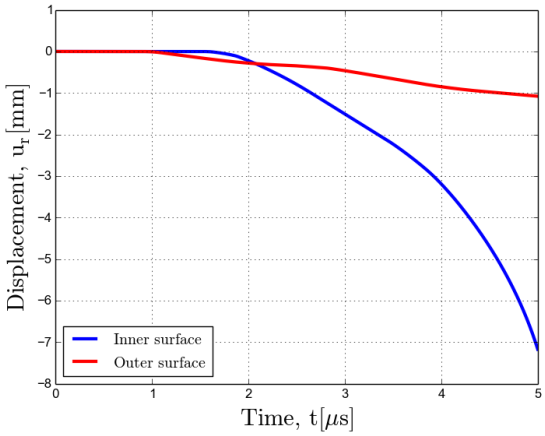


(e) α vs. t on boundaries

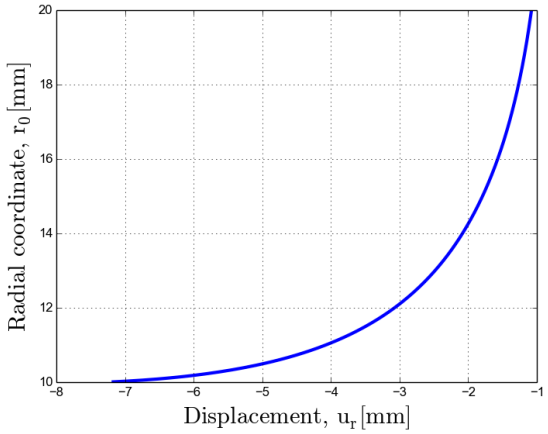


(f) α vs. r_0 at final time

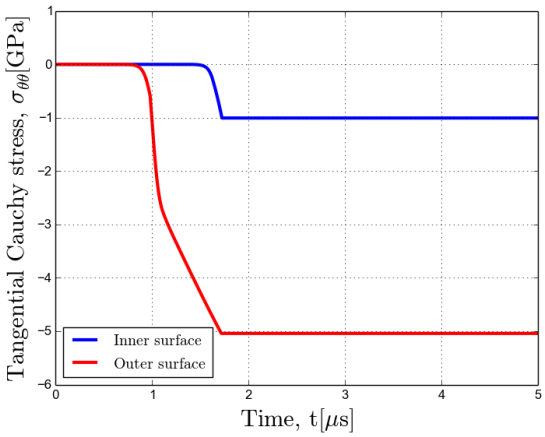
Figure 12: Case (l).



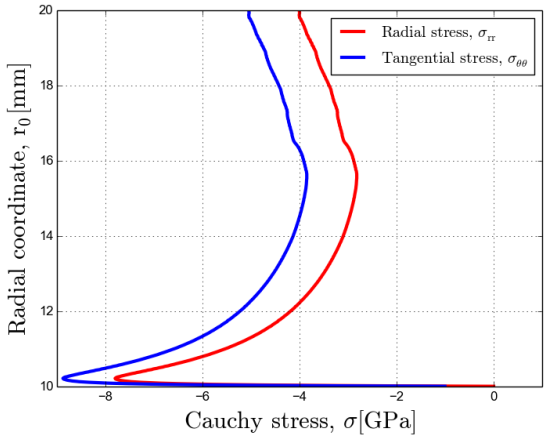
(a) u_r vs. t on boundaries



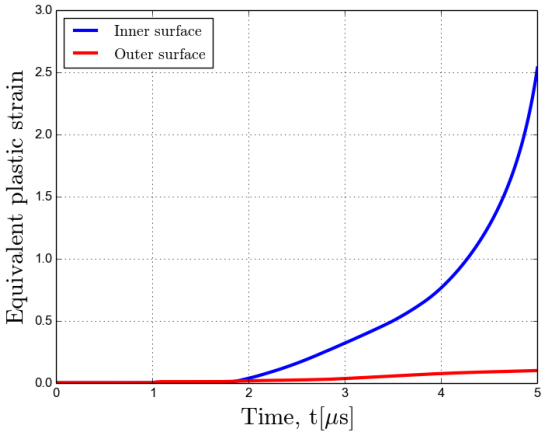
(b) u_r vs. r_0 at final time



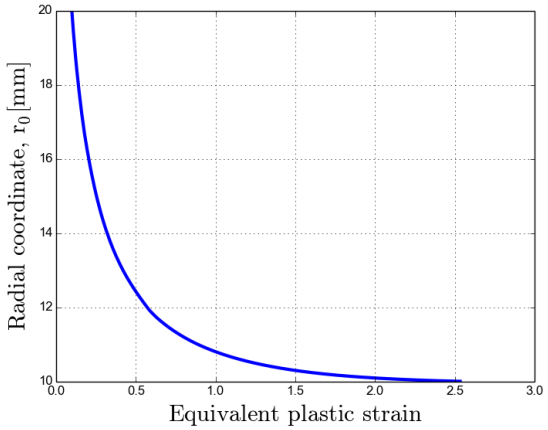
(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

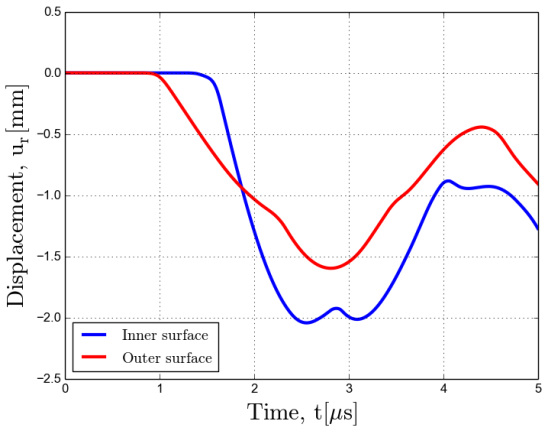


(e) α vs. t on boundaries

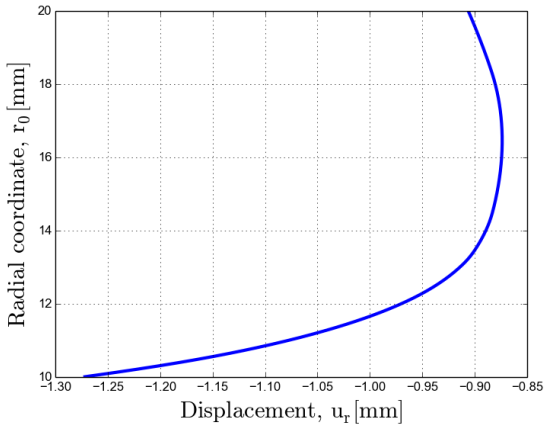


(f) α vs. r_0 at final time

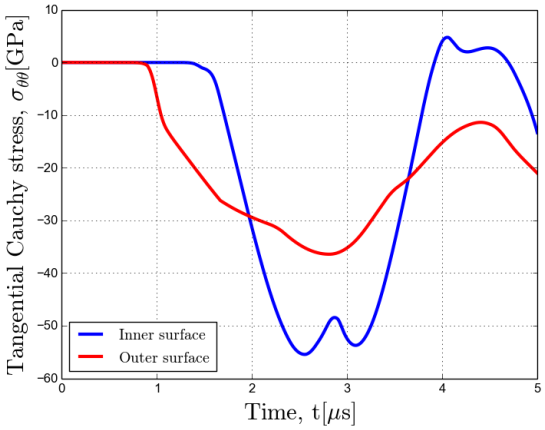
Figure 13: Case (m).



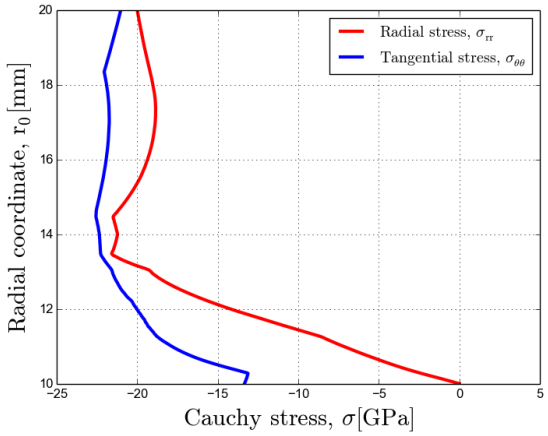
(a) u_r vs. t on boundaries



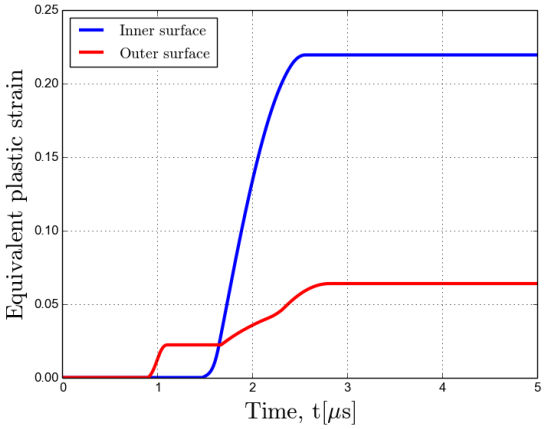
(b) u_r vs. r_0 at final time



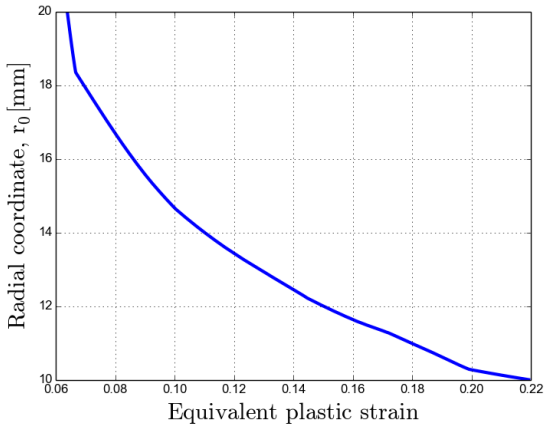
(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

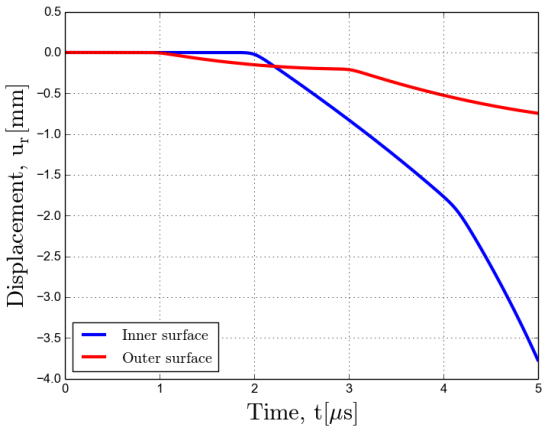


(e) α vs. t on boundaries

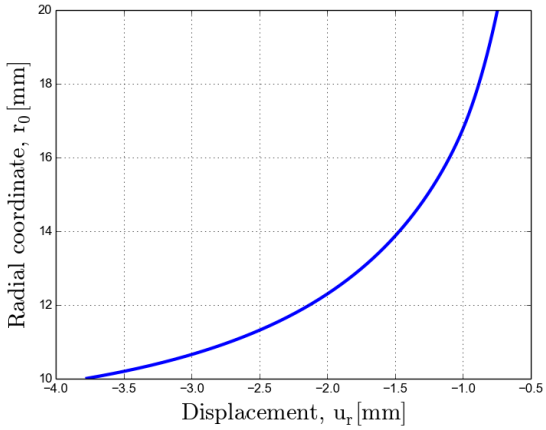


(f) α vs. r_0 at final time

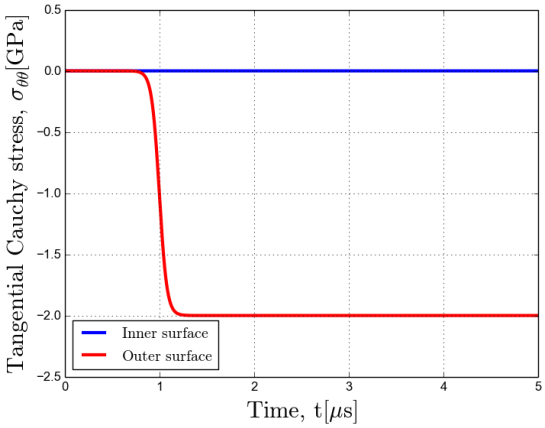
Figure 14: Case (n).



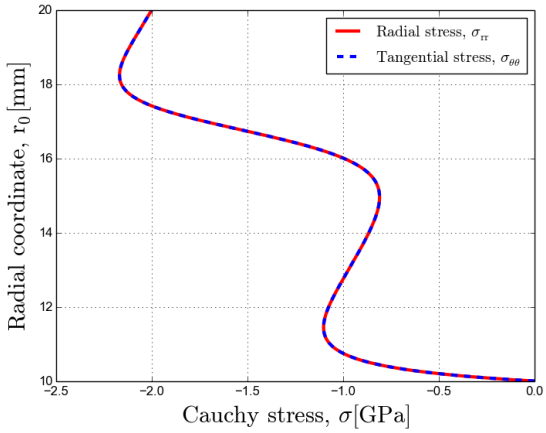
(a) u_r vs. t on boundaries



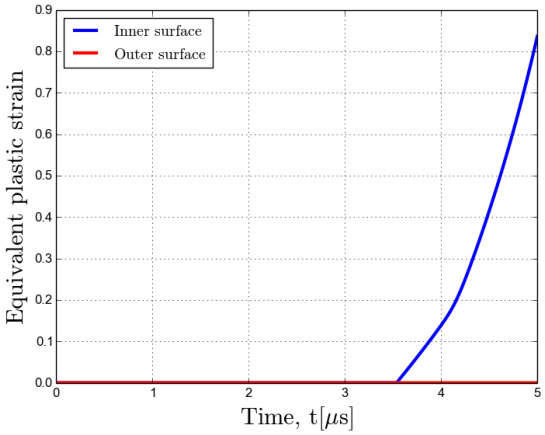
(b) u_r vs. r_0 at final time



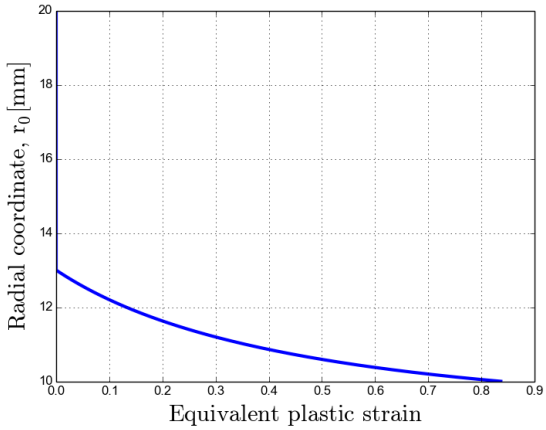
(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

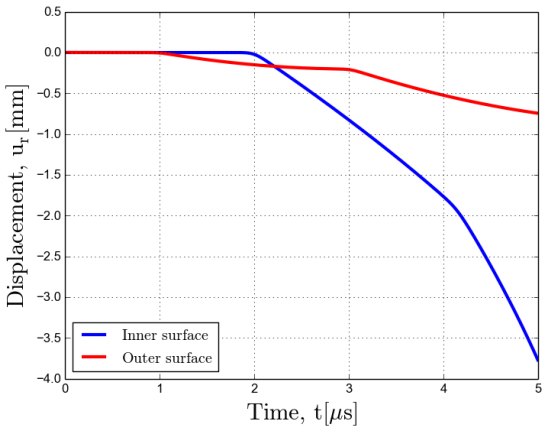


(e) α vs. t on boundaries

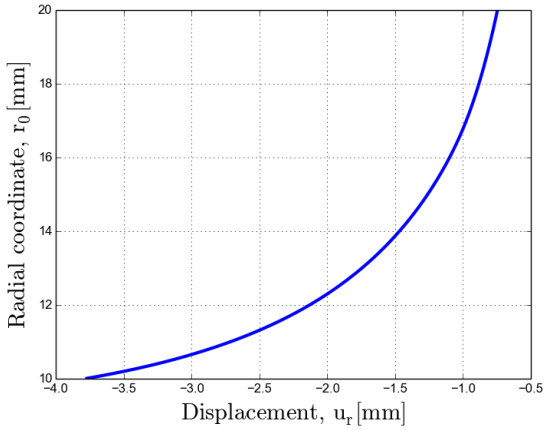


(f) α vs. r_0 at final time

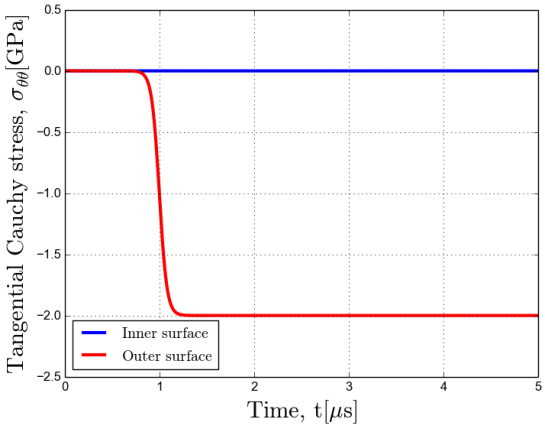
Figure 15: Case (o).



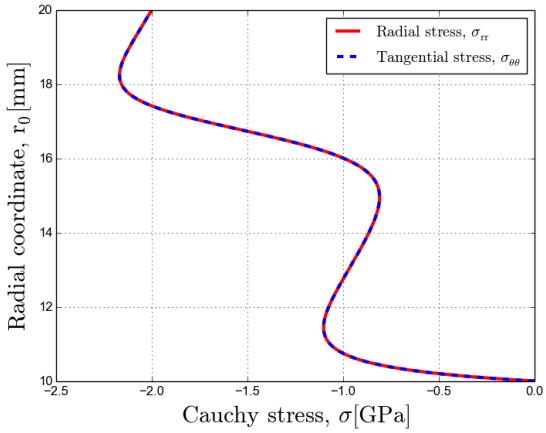
(a) u_r vs. t on boundaries



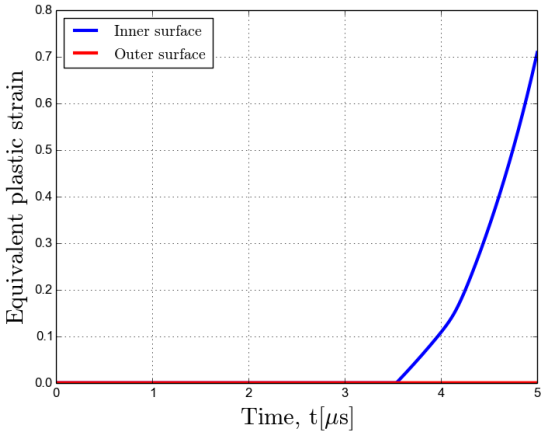
(b) u_r vs. r_0 at final time



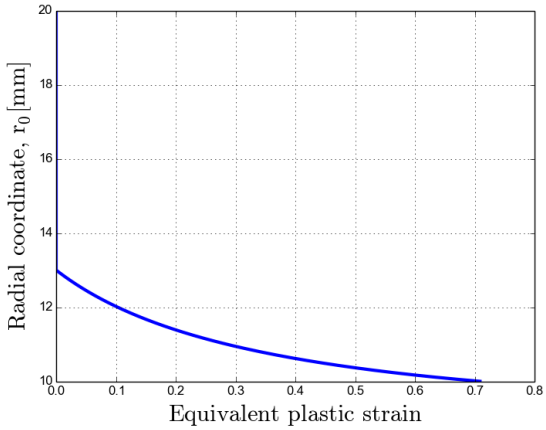
(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

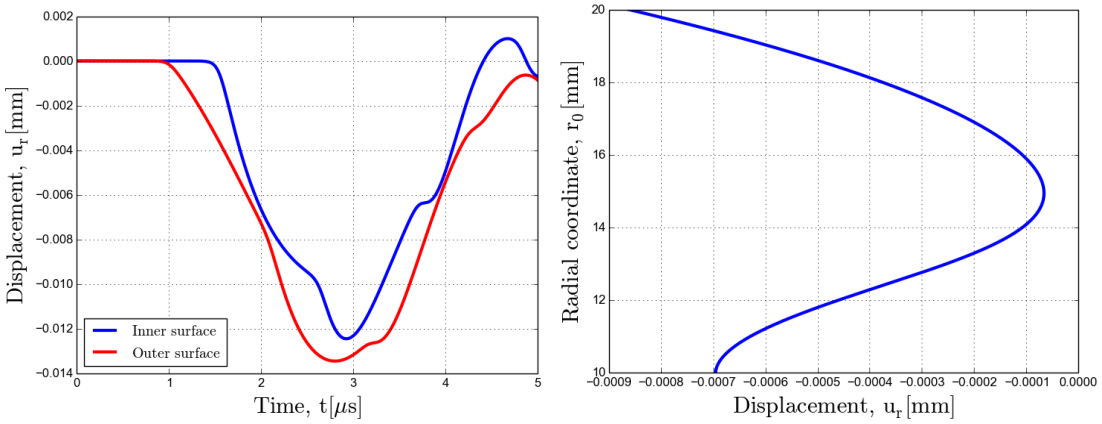


(e) α vs. t on boundaries



(f) α vs. r_0 at final time

Figure 16: Case (p).



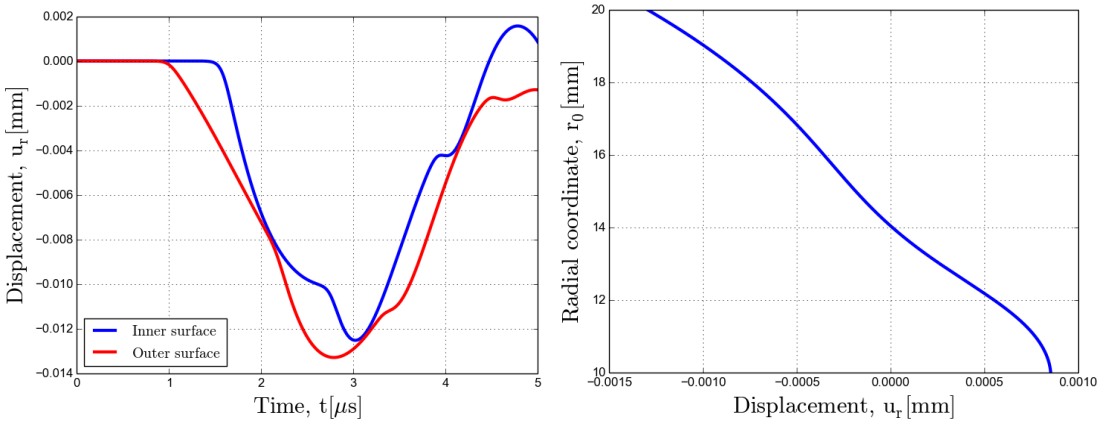
(a) u_r vs. t on boundaries

(b) u_r vs. r_0 at final time

(c) $\sigma_{\theta\theta}$ vs. t on boundaries

(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 17: Case (q).



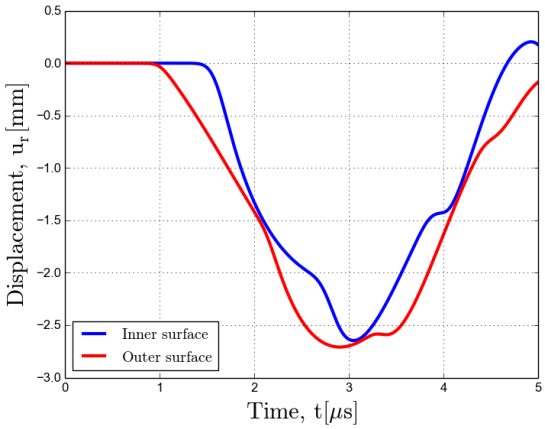
(a) u_r vs. t on boundaries

(b) u_r vs. r_0 at final time

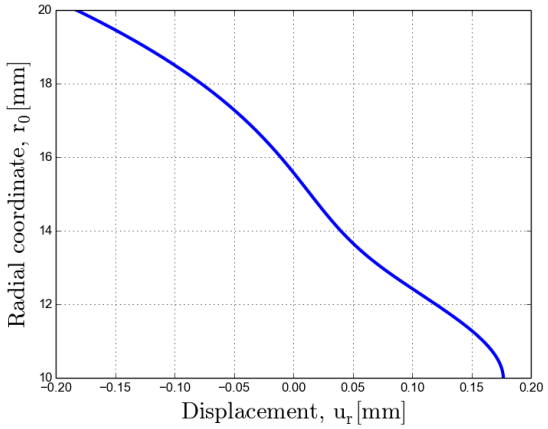
(c) $\sigma_{\theta\theta}$ vs. t on boundaries

(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

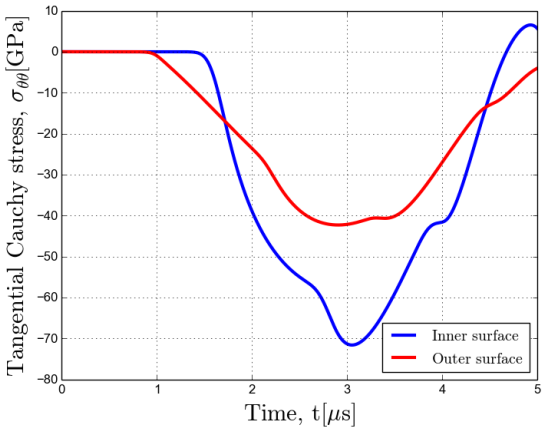
Figure 18: Case (r).



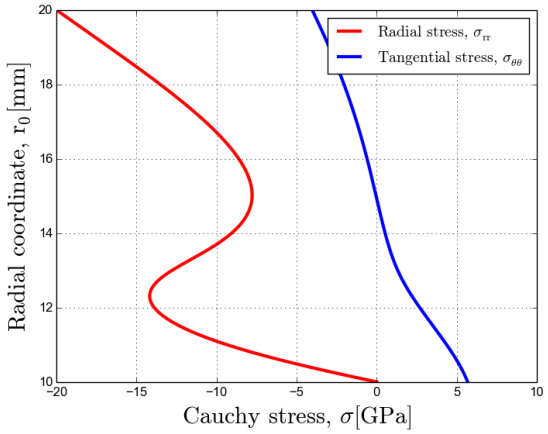
(a) u_r vs. t on boundaries



(b) u_r vs. r_0 at final time

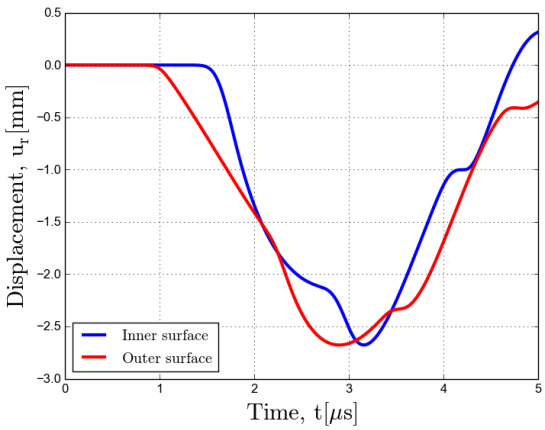


(c) $\sigma_{\theta\theta}$ vs. t on boundaries

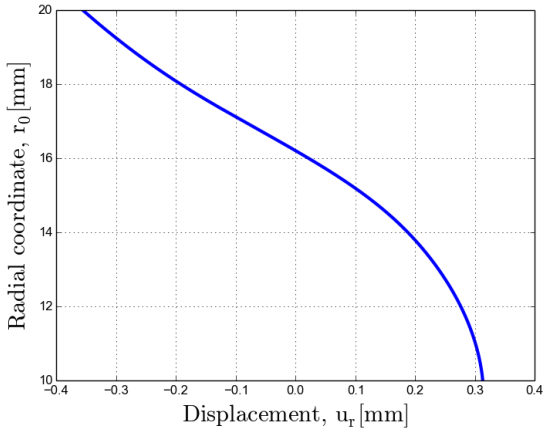


(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

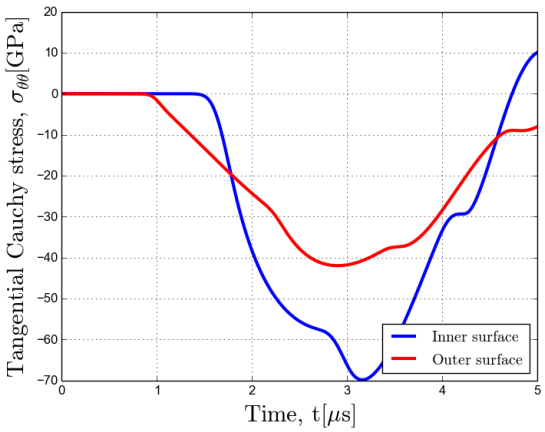
Figure 19: Case (s).



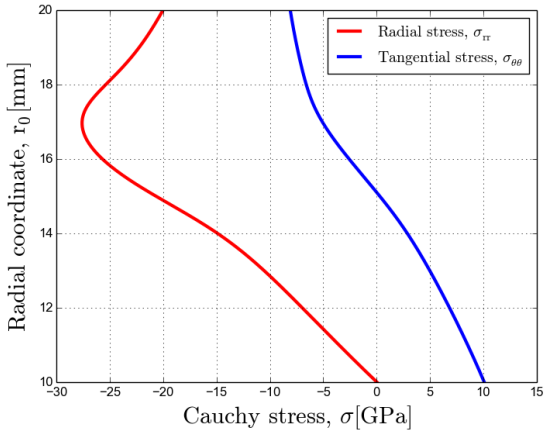
(a) u_r vs. t on boundaries



(b) u_r vs. r_0 at final time



(c) $\sigma_{\theta\theta}$ vs. t on boundaries



(d) σ_{rr}, $\sigma_{\theta\theta}$ vs. r_0 at final time

Figure 20: Case (t).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-4.427×10^{-9}	1.771×10^{-15}	-8.854×10^{-16}
1.001	1.000×10^{1}	1.007×10^{-4}	-2.867×10^{-14}	6.037×10^{-11}
1.501	9.084	-9.164×10^{-1}	1.055×10^{-13}	-4.516×10^{-7}
2.002	8.205	-1.795	-1.060×10^{-13}	-7.624×10^{-7}
2.502	7.430	-2.570	-4.154×10^{-14}	-9.761×10^{-7}
2.998	6.589	-3.411	1.680×10^{-12}	-1.163×10^{-6}
3.499	5.069	-4.931	-4.088×10^{-13}	-1.414×10^{-6}
3.999	3.861	-6.139	1.101×10^{-12}	-1.553×10^{-6}
4.500	2.736	-7.264	2.158×10^{-10}	-1.644×10^{-6}
5.000	9.634×10^{-1}	-9.037	-4.131×10^{-12}	-1.721×10^{-6}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.978×10^{1}	-2.227×10^{-1}	-5.000	-5.181
1.001	1.962×10^{1}	-3.752×10^{-1}	-5.000	-4.928
1.501	1.954×10^{1}	-4.640×10^{-1}	-5.000	-4.789
2.002	1.951×10^{1}	-4.939×10^{-1}	-5.000	-4.744
2.502	1.903×10^{1}	-9.691×10^{-1}	-5.000	-4.105
2.998	1.861×10^{1}	-1.388	-5.000	-3.643
3.499	1.826×10^{1}	-1.741	-5.000	-3.311
3.999	1.761×10^{1}	-2.394	-5.000	-2.799
4.500	1.685×10^{1}	-3.153	-5.000	-2.329
5.000	1.617×10^{1}	-3.826	-5.000	-1.993

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	9.634×10^{-1}	-9.037	-4.131×10^{-12}	-1.721×10^{-6}
10.2459	1.388	-8.858	2.096×10^{1}	1.295×10^{-1}
10.9538	2.601	-8.353	2.439×10^{1}	4.736×10^{-1}
12.0547	4.454	-7.600	1.958×10^{1}	9.689×10^{-1}
13.4419	6.715	-6.727	1.633×10^{1}	1.597
15.0196	9.178	-5.842	1.495×10^{1}	2.400
16.5581	1.147×10^{1}	-5.083	1.505×10^{1}	3.380
17.9453	1.347×10^{1}	-4.479	6.389	1.868
19.0462	1.494×10^{1}	-4.109	-4.844	-1.728
19.7541	1.586×10^{1}	-3.896	-4.961	-1.924
20.0000	1.617×10^{1}	-3.826	-5.000	-1.993

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 5: Case (a).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	1.504×10^{-11}	3.997×10^{-14}	3.007×10^{-10}
1.001	9.124	-8.760×10^{-1}	-2.637×10^{-15}	-1.589×10^{1}
1.501	7.138	-2.862	7.530×10^{-14}	-4.258×10^{1}
2.002	6.533	-3.467	-2.064×10^{-13}	-4.876×10^{1}
2.502	6.079	-3.921	-1.343×10^{-13}	-5.290×10^{1}
2.998	5.677	-4.323	-3.113×10^{-14}	-5.624×10^{1}
3.499	6.864	-3.136	3.083×10^{-14}	-4.547×10^{1}
3.999	7.793	-2.207	-2.002×10^{-13}	-3.496×10^{1}
4.500	8.891	-1.109	1.490×10^{-13}	-1.963×10^{1}
5.000	1.035×10^{1}	3.516×10^{-1}	2.133×10^{-14}	7.332

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.919×10^{1}	-8.058×10^{-1}	-2.000×10^{1}	-1.610×10^{1}
1.001	1.849×10^{1}	-1.506	-2.000×10^{1}	-2.168×10^{1}
1.501	1.799×10^{1}	-2.014	-2.000×10^{1}	-2.543×10^{1}
2.002	1.687×10^{1}	-3.130	-2.000×10^{1}	-3.290×10^{1}
2.502	1.661×10^{1}	-3.386	-2.000×10^{1}	-3.449×10^{1}
2.998	1.698×10^{1}	-3.018	-2.000×10^{1}	-3.220×10^{1}
3.499	1.698×10^{1}	-3.022	-2.000×10^{1}	-3.222×10^{1}
3.999	1.797×10^{1}	-2.033	-2.000×10^{1}	-2.556×10^{1}
4.500	1.904×10^{1}	-9.592×10^{-1}	-2.000×10^{1}	-1.736×10^{1}
5.000	1.920×10^{1}	-8.017×10^{-1}	-2.000×10^{1}	-1.606×10^{1}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	1.035×10^{1}	3.516×10^{-1}	2.133×10^{-14}	7.332
10.2459	1.059×10^{1}	3.451×10^{-1}	-8.332×10^{-1}	6.736
10.9538	1.127×10^{1}	3.209×10^{-1}	-3.153	4.985
12.0547	1.232×10^{1}	2.675×10^{-1}	-6.561	2.188
13.4419	1.362×10^{1}	1.744×10^{-1}	-1.056×10^{1}	-1.410
15.0196	1.505×10^{1}	3.487×10^{-2}	-1.728×10^{1}	-6.906
16.5581	1.631×10^{1}	-2.483×10^{-1}	-2.983×10^{1}	-1.971×10^{1}
17.9453	1.738×10^{1}	-5.652×10^{-1}	-3.002×10^{1}	-2.200×10^{1}
19.0462	1.834×10^{1}	-7.083×10^{-1}	-2.172×10^{1}	-1.658×10^{1}
19.7541	1.898×10^{1}	-7.790×10^{-1}	-2.039×10^{1}	-1.618×10^{1}
20.0000	1.920×10^{1}	-8.017×10^{-1}	-2.000×10^{1}	-1.606×10^{1}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 6: Case (b).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-1.439×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-2.487×10^{-14}	9.770×10^{-21}	-4.885×10^{-21}
1.501	1.000×10^{1}	-2.461×10^{-7}	-1.259×10^{-14}	-1.602×10^{-13}
2.002	9.965	-3.512×10^{-2}	-5.882×10^{-11}	-2.095×10^{-8}
2.502	9.246	-7.539×10^{-1}	-4.333×10^{-12}	-3.832×10^{-7}
2.998	8.531	-1.469	-2.565×10^{-10}	-6.572×10^{-7}
3.499	7.881	-2.119	-5.136×10^{-10}	-8.576×10^{-7}
3.999	7.158	-2.842	-3.962×10^{-11}	-1.041×10^{-6}
4.500	5.903	-4.097	-3.816×10^{-11}	-1.288×10^{-6}
5.000	4.852	-5.148	-3.449×10^{-11}	-1.442×10^{-6}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-5.905×10^{-8}	-1.506×10^{-5}	-1.506×10^{-5}
1.001	1.999×10^{1}	-1.107×10^{-2}	-2.021	-2.100
1.501	1.982×10^{1}	-1.768×10^{-1}	-4.000	-4.116
2.002	1.970×10^{1}	-2.994×10^{-1}	-4.000	-3.956
2.502	1.963×10^{1}	-3.712×10^{-1}	-4.000	-3.867
2.998	1.960×10^{1}	-4.048×10^{-1}	-4.000	-3.826
3.499	1.922×10^{1}	-7.776×10^{-1}	-4.000	-3.417
3.999	1.888×10^{1}	-1.116	-4.000	-3.099
4.500	1.860×10^{1}	-1.399	-4.000	-2.866
5.000	1.811×10^{1}	-1.887	-4.000	-2.519

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	4.852	-5.148	-3.449×10^{-11}	-1.442×10^{-6}
10.2459	5.242	-5.004	4.226×10^{-1}	4.463×10^{-2}
10.9538	6.339	-4.614	1.151	1.651×10^{-1}
12.0547	7.984	-4.071	1.625	3.342×10^{-1}
13.4419	9.956	-3.486	1.826	5.224×10^{-1}
15.0196	1.208×10^{1}	-2.938	1.815	6.814×10^{-1}
16.5581	1.405×10^{1}	-2.504	9.190×10^{-2}	4.243×10^{-2}
17.9453	1.574×10^{1}	-2.210	-5.639	-3.122
19.0462	1.702×10^{1}	-2.028	-5.057	-3.028
19.7541	1.783×10^{1}	-1.923	-4.257	-2.648
20.0000	1.811×10^{1}	-1.887	-4.000	-2.519

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 7: Case (c).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-1.232×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-1.893×10^{-9}	-3.877×10^{-24}	-3.786×10^{-8}
1.501	9.999	-5.112×10^{-4}	-1.999×10^{-14}	-1.022×10^{-2}
2.002	9.035	-9.651×10^{-1}	-1.607×10^{-10}	-1.734×10^{1}
2.502	7.144	-2.856	2.955×10^{-11}	-4.251×10^{1}
2.998	6.541	-3.459	-1.372×10^{-13}	-4.868×10^{1}
3.499	5.987	-4.013	-1.507×10^{-9}	-5.369×10^{1}
3.999	5.688	-4.312	7.077×10^{-10}	-5.616×10^{1}
4.500	6.869	-3.131	3.693×10^{-11}	-4.543×10^{1}
5.000	7.667	-2.333	2.399×10^{-14}	-3.651×10^{1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-2.264×10^{-7}	-7.531×10^{-5}	-2.737×10^{-5}
1.001	1.996×10^{1}	-4.332×10^{-2}	-1.010×10^{1}	-4.254
1.501	1.920×10^{1}	-7.998×10^{-1}	-2.000×10^{1}	-1.605×10^{1}
2.002	1.850×10^{1}	-1.500	-2.000×10^{1}	-2.163×10^{1}
2.502	1.799×10^{1}	-2.012	-2.000×10^{1}	-2.541×10^{1}
2.998	1.689×10^{1}	-3.112	-2.000×10^{1}	-3.279×10^{1}
3.499	1.662×10^{1}	-3.376	-2.000×10^{1}	-3.443×10^{1}
3.999	1.697×10^{1}	-3.031	-2.000×10^{1}	-3.228×10^{1}
4.500	1.699×10^{1}	-3.009	-2.000×10^{1}	-3.214×10^{1}
5.000	1.798×10^{1}	-2.025	-2.000×10^{1}	-2.550×10^{1}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	7.667	-2.333	2.399×10^{-14}	-3.651×10^{1}
10.2459	7.943	-2.303	-3.449	-3.631×10^{1}
10.9538	8.723	-2.231	-6.037	-3.439×10^{1}
12.0547	9.944	-2.110	5.791×10^{-1}	-2.885×10^{1}
13.4419	1.144×10^{1}	-2.000	-1.016×10^{1}	-2.841×10^{1}
15.0196	1.306×10^{1}	-1.961	-1.768×10^{1}	-2.862×10^{1}
16.5581	1.460×10^{1}	-1.961	-1.861×10^{1}	-2.732×10^{1}
17.9453	1.597×10^{1}	-1.978	-1.921×10^{1}	-2.642×10^{1}
19.0462	1.705×10^{1}	-2.000	-1.965×10^{1}	-2.588×10^{1}
19.7541	1.774×10^{1}	-2.018	-1.992×10^{1}	-2.559×10^{1}
20.0000	1.798×10^{1}	-2.025	-2.000×10^{1}	-2.550×10^{1}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 8: Case (d).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-2.722×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-1.065×10^{-9}	-4.163×10^{-15}	-1.420×10^{-8}
1.501	1.000×10^{1}	-2.886×10^{-4}	-1.041×10^{-14}	-3.848×10^{-3}
2.002	9.169	-8.314×10^{-1}	-4.647×10^{-11}	-1.027×10^{1}
2.502	6.858	-3.142	-1.788×10^{-11}	-3.177×10^{1}
2.998	5.704	-4.296	-5.968×10^{-10}	-3.945×10^{1}
3.499	4.816	-5.184	-1.735×10^{-10}	-4.421×10^{1}
3.999	3.142	-6.858	-4.008×10^{-11}	-5.077×10^{1}
4.500	3.149	-6.851	4.924×10^{-10}	-5.075×10^{1}
5.000	3.195	-6.805	1.804×10^{-11}	-5.061×10^{1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-2.352×10^{-7}	-7.531×10^{-5}	-1.830×10^{-5}
1.001	1.995×10^{1}	-4.514×10^{-2}	-1.010×10^{1}	-2.877
1.501	1.913×10^{1}	-8.704×10^{-1}	-2.000×10^{1}	-1.149×10^{1}
2.002	1.827×10^{1}	-1.730	-2.000×10^{1}	-1.621×10^{1}
2.502	1.749×10^{1}	-2.511	-2.000×10^{1}	-2.011×10^{1}
2.998	1.604×10^{1}	-3.961	-2.000×10^{1}	-2.655×10^{1}
3.499	1.503×10^{1}	-4.966	-2.000×10^{1}	-3.048×10^{1}
3.999	1.465×10^{1}	-5.346	-2.000×10^{1}	-3.187×10^{1}
4.500	1.389×10^{1}	-6.112	-2.000×10^{1}	-3.450×10^{1}
5.000	1.400×10^{1}	-5.999	-2.000×10^{1}	-3.412×10^{1}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	3.195	-6.805	1.804×10^{-11}	-5.061×10^{1}
10.2459	3.484	-6.762	-2.400×10^{1}	-5.092×10^{1}
10.9538	4.296	-6.658	-6.638×10^{1}	-5.187×10^{1}
12.0547	5.500	-6.554	-9.578×10^{1}	-5.359×10^{1}
13.4419	6.980	-6.462	-5.641×10^{1}	-4.819×10^{1}
15.0196	8.681	-6.338	-3.614×10^{1}	-4.347×10^{1}
16.5581	1.034×10^{1}	-6.221	-2.783×10^{1}	-4.001×10^{1}
17.9453	1.182×10^{1}	-6.125	-2.383×10^{1}	-3.742×10^{1}
19.0462	1.299×10^{1}	-6.055	-2.161×10^{1}	-3.559×10^{1}
19.7541	1.374×10^{1}	-6.013	-2.040×10^{1}	-3.449×10^{1}
20.0000	1.400×10^{1}	-5.999	-2.000×10^{1}	-3.412×10^{1}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 9: Case (e).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-1.633×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-7.312×10^{-11}	-1.480×10^{-14}	-1.463×10^{-9}
1.501	1.000×10^{1}	-2.048×10^{-5}	-7.402×10^{-15}	-4.096×10^{-4}
2.002	9.654	-3.459×10^{-1}	-1.676×10^{-11}	-6.578
2.502	7.973	-2.027	-4.964×10^{-12}	-3.118×10^{1}
2.998	7.437	-2.563	8.148×10^{-14}	-3.715×10^{1}
3.499	7.643	-2.357	8.516×10^{-11}	-3.495×10^{1}
3.999	7.363	-2.637	2.109×10^{-11}	-3.792×10^{1}
4.500	8.066	-1.934	2.261×10^{-10}	-3.008×10^{1}
5.000	9.395	-6.050×10^{-1}	2.742×10^{-10}	-1.110×10^{1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-1.825×10^{-7}	-5.272×10^{-5}	-2.818×10^{-5}
1.001	1.997×10^{1}	-3.482×10^{-2}	-7.073	-4.322
1.501	1.939×10^{1}	-6.142×10^{-1}	-1.400×10^{1}	-1.435×10^{1}
2.002	1.891×10^{1}	-1.092	-1.400×10^{1}	-1.802×10^{1}
2.502	1.862×10^{1}	-1.377	-1.400×10^{1}	-2.009×10^{1}
2.998	1.822×10^{1}	-1.778	-1.400×10^{1}	-2.287×10^{1}
3.499	1.785×10^{1}	-2.150	-1.400×10^{1}	-2.532×10^{1}
3.999	1.818×10^{1}	-1.819	-1.400×10^{1}	-2.315×10^{1}
4.500	1.877×10^{1}	-1.232	-1.400×10^{1}	-1.905×10^{1}
5.000	1.885×10^{1}	-1.146	-1.400×10^{1}	-1.842×10^{1}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	9.395	-6.050×10^{-1}	2.742×10^{-10}	-1.110×10^{1}
10.2459	9.654	-5.920×10^{-1}	-9.521×10^{-1}	-1.108×10^{1}
10.9538	1.039×10^{1}	-5.650×10^{-1}	-3.324	-1.119×10^{1}
12.0547	1.151×10^{1}	-5.491×10^{-1}	-6.243	-1.172×10^{1}
13.4419	1.288×10^{1}	-5.654×10^{-1}	-9.369	-1.297×10^{1}
15.0196	1.437×10^{1}	-6.458×10^{-1}	-1.672×10^{1}	-1.842×10^{1}
16.5581	1.573×10^{1}	-8.295×10^{-1}	-2.285×10^{1}	-2.535×10^{1}
17.9453	1.693×10^{1}	-1.012	-2.011×10^{1}	-2.320×10^{1}
19.0462	1.795×10^{1}	-1.097	-1.624×10^{1}	-2.010×10^{1}
19.7541	1.862×10^{1}	-1.135	-1.454×10^{1}	-1.882×10^{1}
20.0000	1.885×10^{1}	-1.146	-1.400×10^{1}	-1.842×10^{1}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 10: Case (f).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-2.618×10^{-10}	1.047×10^{-16}	-5.236×10^{-17}
1.001	1.000×10^{1}	-4.460×10^{-4}	1.092×10^{-14}	-2.676×10^{-10}
1.501	9.799	-2.010×10^{-1}	-2.677×10^{-13}	-1.244×10^{-7}
2.002	9.593	-4.072×10^{-1}	-1.305×10^{-11}	-2.607×10^{-7}
2.502	9.380	-6.195×10^{-1}	-3.334×10^{-11}	-4.116×10^{-7}
2.998	9.163	-8.370×10^{-1}	-9.122×10^{-13}	-5.789×10^{-7}
3.499	8.753	-1.247	-3.893×10^{-11}	-9.376×10^{-7}
3.999	8.285	-1.715	-1.588×10^{-12}	-1.436×10^{-6}
4.500	7.780	-2.220	-3.296×10^{-12}	-2.125×10^{-6}
5.000	7.226	-2.774	-7.891×10^{-12}	-3.146×10^{-6}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.996×10^{1}	-4.383×10^{-2}	-1.000	-1.000
1.001	1.992×10^{1}	-7.523×10^{-2}	-1.000	-1.000
1.501	1.991×10^{1}	-9.417×10^{-2}	-1.000	-1.000
2.002	1.990×10^{1}	-1.007×10^{-1}	-1.000	-1.000
2.502	1.981×10^{1}	-1.905×10^{-1}	-1.000	-1.000
2.998	1.973×10^{1}	-2.686×10^{-1}	-1.000	-1.000
3.499	1.967×10^{1}	-3.346×10^{-1}	-1.000	-1.000
3.999	1.961×10^{1}	-3.876×10^{-1}	-1.000	-1.000
4.500	1.951×10^{1}	-4.887×10^{-1}	-1.000	-1.000
5.000	1.940×10^{1}	-6.031×10^{-1}	-1.000	-1.000

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	7.226	-2.774	-7.891×10^{-12}	-3.146×10^{-6}
10.2459	7.679	-2.567	-9.485×10^{-2}	-9.485×10^{-2}
10.9538	8.841	-2.112	-2.169×10^{-1}	-2.169×10^{-1}
12.0547	1.041×10^{1}	-1.647	-2.487×10^{-1}	-2.487×10^{-1}
13.4419	1.215×10^{1}	-1.288	-1.640	-1.640
15.0196	1.399×10^{1}	-1.026	-1.433	-1.433
16.5581	1.571×10^{1}	-8.494×10^{-1}	-1.270	-1.270
17.9453	1.721×10^{1}	-7.316×10^{-1}	-1.148	-1.148
19.0462	1.839×10^{1}	-6.573×10^{-1}	-1.065	-1.065
19.7541	1.914×10^{1}	-6.163×10^{-1}	-1.016	-1.016
20.0000	1.940×10^{1}	-6.031×10^{-1}	-1.000	-1.000

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 11: Case (g).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-2.585×10^{-7}	-1.442×10^{-14}	-5.170×10^{-6}
1.001	8.688	-1.312	1.574×10^{-14}	-3.096×10^{1}
1.501	7.655	-2.345	-2.119×10^{-14}	-6.159×10^{1}
2.002	7.628	-2.372	1.427×10^{-14}	-6.246×10^{1}
2.502	7.273	-2.727	2.861×10^{-13}	-7.360×10^{1}
2.998	7.399	-2.601	1.384×10^{-12}	-6.966×10^{1}
3.499	8.677	-1.323	5.784×10^{-14}	-3.123×10^{1}
3.999	9.548	-4.516×10^{-1}	-1.556×10^{-14}	-9.564
4.500	1.000×10^{1}	1.000×10^{-3}	1.815×10^{-12}	2.000×10^{-2}
5.000	1.040×10^{1}	4.039×10^{-1}	-3.960×10^{-15}	7.685

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.924×10^{1}	-7.598×10^{-1}	-2.000×10^{1}	-1.300×10^{1}
1.001	1.845×10^{1}	-1.550	-2.000×10^{1}	-2.126×10^{1}
1.501	1.772×10^{1}	-2.276	-2.000×10^{1}	-2.947×10^{1}
2.002	1.648×10^{1}	-3.519	-2.000×10^{1}	-4.484×10^{1}
2.502	1.653×10^{1}	-3.468	-2.000×10^{1}	-4.418×10^{1}
2.998	1.722×10^{1}	-2.777	-2.000×10^{1}	-3.548×10^{1}
3.499	1.786×10^{1}	-2.143	-2.000×10^{1}	-2.792×10^{1}
3.999	1.917×10^{1}	-8.324×10^{-1}	-2.000×10^{1}	-1.373×10^{1}
4.500	1.973×10^{1}	-2.690×10^{-1}	-2.000×10^{1}	-8.210
5.000	1.929×10^{1}	-7.131×10^{-1}	-2.000×10^{1}	-1.253×10^{1}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	1.040×10^{1}	4.039×10^{-1}	-3.960×10^{-15}	7.685
10.2459	1.064×10^{1}	3.961×10^{-1}	-1.386	6.876
10.9538	1.132×10^{1}	3.657×10^{-1}	-5.172	4.624
12.0547	1.235×10^{1}	2.972×10^{-1}	-1.065×10^{1}	1.315
13.4419	1.362×10^{1}	1.787×10^{-1}	-1.694×10^{1}	-2.507
15.0196	1.503×10^{1}	6.435×10^{-3}	-2.308×10^{1}	-6.321
16.5581	1.637×10^{1}	-1.896×10^{-1}	-2.738×10^{1}	-9.369
17.9453	1.751×10^{1}	-4.379×10^{-1}	-3.842×10^{1}	-1.345×10^{1}
19.0462	1.844×10^{1}	-6.091×10^{-1}	-2.893×10^{1}	-1.346×10^{1}
19.7541	1.906×10^{1}	-6.905×10^{-1}	-2.229×10^{1}	-1.285×10^{1}
20.0000	1.929×10^{1}	-7.131×10^{-1}	-2.000×10^{1}	-1.253×10^{1}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 12: Case (h).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-6.443×10^{-18}	0.000	0.000
1.001	1.000×10^{1}	-1.849×10^{-14}	7.772×10^{-21}	-3.775×10^{-21}
1.501	1.000×10^{1}	-1.846×10^{-7}	-3.892×10^{-15}	-1.146×10^{-13}
2.002	9.966	-3.360×10^{-2}	-2.217×10^{-13}	-2.026×10^{-8}
2.502	9.396	-6.044×10^{-1}	-3.058×10^{-12}	-4.005×10^{-7}
2.998	8.745	-1.255	-3.159×10^{-13}	-9.453×10^{-7}
3.499	8.018	-1.982	-7.384×10^{-13}	-1.776×10^{-6}
3.999	7.191	-2.809	-2.831×10^{-12}	-3.222×10^{-6}
4.500	5.846	-4.154	-2.629×10^{-14}	-8.219×10^{-6}
5.000	3.337	-6.663	1.225×10^{-13}	-8.054×10^{-5}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-4.428×10^{-8}	-1.130×10^{-5}	-1.130×10^{-5}
1.001	1.999×10^{1}	-8.244×10^{-3}	-1.516	-1.516
1.501	1.987×10^{1}	-1.315×10^{-1}	-3.000	-3.000
2.002	1.977×10^{1}	-2.264×10^{-1}	-3.000	-3.000
2.502	1.972×10^{1}	-2.843×10^{-1}	-3.000	-3.000
2.998	1.969×10^{1}	-3.141×10^{-1}	-3.000	-3.000
3.499	1.945×10^{1}	-5.466×10^{-1}	-3.000	-3.000
3.999	1.923×10^{1}	-7.652×10^{-1}	-3.000	-3.000
4.500	1.906×10^{1}	-9.397×10^{-1}	-3.000	-3.000
5.000	1.893×10^{1}	-1.068	-3.000	-3.000

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	3.337	-6.663	1.225×10^{-13}	-8.054×10^{-5}
10.2459	4.776	-5.470	-6.413	-6.413
10.9538	6.935	-4.019	-5.220	-5.220
12.0547	9.093	-2.961	-3.717	-3.717
13.4419	1.121×10^{1}	-2.236	-2.922	-2.922
15.0196	1.327×10^{1}	-1.751	-3.686	-3.686
16.5581	1.510×10^{1}	-1.459	-3.893	-3.893
17.9453	1.667×10^{1}	-1.271	-3.503	-3.503
19.0462	1.789×10^{1}	-1.154	-3.217	-3.217
19.7541	1.866×10^{1}	-1.089	-3.053	-3.053
20.0000	1.893×10^{1}	-1.068	-3.000	-3.000

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 13: Case (i).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	4.857×10^{-16}	0.000	0.000
1.001	1.000×10^{1}	-1.893×10^{-9}	3.553×10^{-14}	-3.786×10^{-8}
1.501	9.999	-5.141×10^{-4}	3.681×10^{-14}	-1.028×10^{-2}
2.002	8.712	-1.288	1.356×10^{-13}	-3.029×10^{1}
2.502	7.669	-2.331	-5.646×10^{-11}	-6.117×10^{1}
2.998	7.634	-2.366	5.738×10^{-12}	-6.228×10^{1}
3.499	7.335	-2.665	-3.467×10^{-10}	-7.165×10^{1}
3.999	7.411	-2.589	2.017×10^{-10}	-6.925×10^{1}
4.500	8.672	-1.328	-1.316×10^{-14}	-3.139×10^{1}
5.000	9.500	-5.003×10^{-1}	0.000	-1.066×10^{1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-2.264×10^{-7}	-7.531×10^{-5}	-2.737×10^{-5}
1.001	1.996×10^{1}	-4.202×10^{-2}	-1.010×10^{1}	-3.526
1.501	1.924×10^{1}	-7.613×10^{-1}	-2.000×10^{1}	-1.301×10^{1}
2.002	1.845×10^{1}	-1.548	-2.000×10^{1}	-2.124×10^{1}
2.502	1.768×10^{1}	-2.316	-2.000×10^{1}	-2.994×10^{1}
2.998	1.651×10^{1}	-3.487	-2.000×10^{1}	-4.442×10^{1}
3.499	1.654×10^{1}	-3.457	-2.000×10^{1}	-4.403×10^{1}
3.999	1.723×10^{1}	-2.766	-2.000×10^{1}	-3.535×10^{1}
4.500	1.788×10^{1}	-2.116	-2.000×10^{1}	-2.761×10^{1}
5.000	1.915×10^{1}	-8.456×10^{-1}	-2.000×10^{1}	-1.386×10^{1}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	9.500	-5.003×10^{-1}	0.000	-1.066×10^{1}
10.2459	9.749	-4.972×10^{-1}	-5.594	-1.186×10^{1}
10.9538	1.043×10^{1}	-5.214×10^{-1}	-1.471×10^{1}	-1.385×10^{1}
12.0547	1.147×10^{1}	-5.815×10^{-1}	-1.374×10^{1}	-1.378×10^{1}
13.4419	1.281×10^{1}	-6.279×10^{-1}	-8.428	-1.219×10^{1}
15.0196	1.437×10^{1}	-6.469×10^{-1}	-6.102	-1.080×10^{1}
16.5581	1.589×10^{1}	-6.681×10^{-1}	-8.226	-1.078×10^{1}
17.9453	1.723×10^{1}	-7.137×10^{-1}	-1.242×10^{1}	-1.169×10^{1}
19.0462	1.827×10^{1}	-7.745×10^{-1}	-1.644×10^{1}	-1.279×10^{1}
19.7541	1.893×10^{1}	-8.256×10^{-1}	-1.909×10^{1}	-1.358×10^{1}
20.0000	1.915×10^{1}	-8.456×10^{-1}	-2.000×10^{1}	-1.386×10^{1}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 14: Case (j).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.220	1.000×10^{1}	7.047×10^{-17}	0.000	0.000	0.000
0.440	1.000×10^{1}	-1.783×10^{-16}	0.000	0.000	0.000
0.660	1.000×10^{1}	-7.432×10^{-17}	0.000	0.000	0.000
0.880	1.000×10^{1}	-2.069×10^{-12}	-2.153×10^{-14}	-5.008×10^{-11}	0.000
1.101	1.000×10^{1}	-5.713×10^{-10}	3.230×10^{-14}	-1.385×10^{-8}	0.000
1.320	1.000×10^{1}	-1.369×10^{-7}	-2.422×10^{-14}	-3.318×10^{-6}	0.000
1.540	1.000×10^{1}	-3.304×10^{-5}	-1.102×10^{-14}	-8.010×10^{-4}	0.000
1.760	9.998	-2.211×10^{-3}	6.505×10^{-11}	-5.360×10^{-2}	0.000
1.980	9.993	-7.071×10^{-3}	1.187×10^{-14}	-1.001×10^{-1}	5.898×10^{-4}
2.200	9.988	-1.179×10^{-2}	3.767×10^{-15}	-1.001×10^{-1}	1.535×10^{-3}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.220	2.000×10^{1}	-8.484×10^{-13}	-3.317×10^{-10}	-1.209×10^{-10}	0.000
0.440	2.000×10^{1}	-2.281×10^{-10}	-8.355×10^{-8}	-3.062×10^{-8}	0.000
0.660	2.000×10^{1}	-5.601×10^{-8}	-2.050×10^{-5}	-7.511×10^{-6}	0.000
0.880	2.000×10^{1}	-1.341×10^{-5}	-4.788×10^{-3}	-1.758×10^{-3}	0.000
1.101	2.000×10^{1}	-7.125×10^{-4}	-9.250×10^{-2}	-3.945×10^{-2}	0.000
1.320	2.000×10^{1}	-2.230×10^{-3}	-9.997×10^{-2}	-6.033×10^{-2}	0.000
1.540	2.000×10^{1}	-3.792×10^{-3}	-1.000×10^{-1}	-7.927×10^{-2}	0.000
1.760	1.999×10^{1}	-5.314×10^{-3}	-1.000×10^{-1}	-9.772×10^{-2}	0.000
1.980	1.999×10^{1}	-6.726×10^{-3}	-1.000×10^{-1}	-1.149×10^{-1}	0.000
2.200	1.999×10^{1}	-7.958×10^{-3}	-1.000×10^{-1}	-1.298×10^{-1}	0.000

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
10.0000	9.988	-1.179×10^{-2}	3.767×10^{-15}	-1.001×10^{-1}	1.535×10^{-3}
10.2459	1.023×10^{1}	-1.137×10^{-2}	-3.496×10^{-3}	-1.036×10^{-1}	1.376×10^{-3}
10.9538	1.094×10^{1}	-1.036×10^{-2}	-1.328×10^{-2}	-1.133×10^{-1}	9.940×10^{-4}
12.0547	1.205×10^{1}	-9.275×10^{-3}	-2.772×10^{-2}	-1.278×10^{-1}	5.618×10^{-4}
13.4419	1.343×10^{1}	-8.526×10^{-3}	-4.519×10^{-2}	-1.453×10^{-1}	1.950×10^{-4}
15.0196	1.501×10^{1}	-8.143×10^{-3}	-3.958×10^{-2}	-1.397×10^{-1}	4.152×10^{-5}
16.5581	1.655×10^{1}	-7.842×10^{-3}	-2.336×10^{-2}	-1.227×10^{-1}	0.000
17.9453	1.794×10^{1}	-7.679×10^{-3}	-6.483×10^{-2}	-1.254×10^{-1}	0.000
19.0462	1.904×10^{1}	-7.787×10^{-3}	-9.385×10^{-2}	-1.304×10^{-1}	0.000
19.7541	1.975×10^{1}	-7.911×10^{-3}	-9.908×10^{-2}	-1.301×10^{-1}	0.000
20.0000	1.999×10^{1}	-7.958×10^{-3}	-1.000×10^{-1}	-1.298×10^{-1}	0.000

(3) Radial distributions evaluated at final time $t = 2.2\mu s$.

Table 15: Case (k).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.220	1.000×10^{1}	7.321×10^{-27}	0.000	0.000	0.000
0.440	1.000×10^{1}	1.519×10^{-17}	0.000	0.000	0.000
0.661	1.000×10^{1}	-2.210×10^{-13}	2.691×10^{-14}	-8.882×10^{-12}	0.000
0.881	1.000×10^{1}	-8.079×10^{-11}	-1.794×10^{-14}	-3.264×10^{-9}	0.000
1.101	1.000×10^{1}	-1.998×10^{-8}	-3.445×10^{-14}	-8.071×10^{-7}	0.000
1.319	1.000×10^{1}	-4.677×10^{-6}	-2.104×10^{-14}	-1.890×10^{-4}	0.000
1.539	9.999	-7.053×10^{-4}	1.053×10^{-11}	-2.850×10^{-2}	0.000
1.760	9.996	-4.088×10^{-3}	2.288×10^{-13}	-1.653×10^{-1}	0.000
1.980	9.993	-6.632×10^{-3}	-9.996×10^{-15}	-2.342×10^{-1}	1.682×10^{-4}
2.200	9.992	-8.089×10^{-3}	-2.470×10^{-14}	-2.637×10^{-1}	3.141×10^{-4}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.220	2.000×10^{1}	-6.601×10^{-13}	-3.323×10^{-10}	-1.242×10^{-10}	0.000
0.440	2.000×10^{1}	-1.778×10^{-10}	-8.390×10^{-8}	-3.156×10^{-8}	0.000
0.661	2.000×10^{1}	-4.376×10^{-8}	-2.062×10^{-5}	-7.759×10^{-6}	0.000
0.881	2.000×10^{1}	-1.050×10^{-5}	-4.826×10^{-3}	-1.821×10^{-3}	0.000
1.101	2.000×10^{1}	-5.560×10^{-4}	-9.257×10^{-2}	-4.208×10^{-2}	0.000
1.319	2.000×10^{1}	-1.733×10^{-3}	-9.997×10^{-2}	-6.831×10^{-2}	0.000
1.539	2.000×10^{1}	-2.928×10^{-3}	-1.000×10^{-1}	-9.248×10^{-2}	0.000
1.760	2.000×10^{1}	-4.034×10^{-3}	-1.000×10^{-1}	-1.148×10^{-1}	0.000
1.980	1.999×10^{1}	-5.008×10^{-3}	-1.000×10^{-1}	-1.345×10^{-1}	0.000
2.200	1.999×10^{1}	-6.793×10^{-3}	-1.000×10^{-1}	-1.706×10^{-1}	0.000

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
10.0000	9.992	-8.089×10^{-3}	-2.470×10^{-14}	-2.637×10^{-1}	3.141×10^{-4}
10.2471	1.024×10^{1}	-7.914×10^{-3}	-7.410×10^{-3}	-2.612×10^{-1}	2.652×10^{-4}
10.9526	1.095×10^{1}	-7.509×10^{-3}	-2.559×10^{-2}	-2.558×10^{-1}	1.484×10^{-4}
12.0484	1.204×10^{1}	-7.100×10^{-3}	-4.724×10^{-2}	-2.507×10^{-1}	1.630×10^{-5}
13.4290	1.342×10^{1}	-6.814×10^{-3}	-6.443×10^{-2}	-2.266×10^{-1}	0.000
15.0390	1.503×10^{1}	-6.620×10^{-3}	-7.627×10^{-2}	-2.033×10^{-1}	0.000
16.5710	1.656×10^{1}	-6.556×10^{-3}	-9.904×10^{-2}	-1.929×10^{-1}	0.000
17.9516	1.794×10^{1}	-6.631×10^{-3}	-1.216×10^{-1}	-1.898×10^{-1}	0.000
19.0474	1.904×10^{1}	-6.730×10^{-3}	-1.156×10^{-1}	-1.813×10^{-1}	0.000
19.7529	1.975×10^{1}	-6.780×10^{-3}	-1.043×10^{-1}	-1.735×10^{-1}	0.000
20.0000	1.999×10^{1}	-6.793×10^{-3}	-1.000×10^{-1}	-1.706×10^{-1}	0.000

(3) Radial distributions evaluated at final time $t = 2.2\mu s$.

Table 16: Case (l).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	1.000×10^{1}	-1.479×10^{-15}	1.884×10^{-14}	-2.961×10^{-14}	0.000
1.000	1.000×10^{1}	-1.874×10^{-9}	-1.614×10^{-14}	-4.543×10^{-8}	0.000
1.501	9.999	-5.030×10^{-4}	2.503×10^{-14}	-1.220×10^{-2}	0.000
2.001	9.779	-2.210×10^{-1}	-3.195×10^{-14}	-1.006	3.659×10^{-2}
2.501	9.208	-7.920×10^{-1}	-5.875×10^{-14}	-1.006	1.575×10^{-1}
2.999	8.497	-1.503	-2.751×10^{-14}	-1.006	3.191×10^{-1}
3.499	7.772	-2.228	1.774×10^{-13}	-1.006	4.983×10^{-1}
4.000	6.812	-3.188	-1.903×10^{-15}	-1.006	7.634×10^{-1}
4.500	5.304	-4.696	-1.272×10^{-13}	-1.006	1.267
5.000	2.829	-7.171	2.190×10^{-13}	-1.006	2.533

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	2.000×10^{1}	-4.094×10^{-8}	-1.498×10^{-5}	-5.491×10^{-6}	0.000
1.000	1.999×10^{1}	-7.705×10^{-3}	-2.010	-9.993×10^{-1}	2.017×10^{-3}
1.501	1.985×10^{1}	-1.533×10^{-1}	-4.000	-4.263	9.102×10^{-3}
2.001	1.972×10^{1}	-2.806×10^{-1}	-4.000	-5.040	1.564×10^{-2}
2.501	1.965×10^{1}	-3.463×10^{-1}	-4.000	-5.040	2.234×10^{-2}
2.999	1.954×10^{1}	-4.616×10^{-1}	-4.000	-5.040	3.417×10^{-2}
3.499	1.934×10^{1}	-6.575×10^{-1}	-4.000	-5.040	5.442×10^{-2}
4.000	1.915×10^{1}	-8.489×10^{-1}	-4.000	-5.040	7.440×10^{-2}
4.500	1.902×10^{1}	-9.763×10^{-1}	-4.000	-5.040	8.780×10^{-2}
5.000	1.892×10^{1}	-1.078	-4.000	-5.040	9.854×10^{-2}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
10.0000	2.829	-7.171	2.190×10^{-13}	-1.006	2.533
10.2459	4.541	-5.705	-7.752	-8.827	1.583
10.9538	6.826	-4.128	-5.618	-6.673	9.102×10^{-1}
12.0547	9.028	-3.027	-4.136	-5.177	5.606×10^{-1}
13.4419	1.116×10^{1}	-2.286	-3.304	-4.338	3.696×10^{-1}
15.0196	1.324×10^{1}	-1.784	-2.870	-3.901	2.518×10^{-1}
16.5581	1.509×10^{1}	-1.468	-3.099	-4.131	1.822×10^{-1}
17.9453	1.667×10^{1}	-1.272	-3.373	-4.408	1.408×10^{-1}
19.0462	1.789×10^{1}	-1.156	-3.726	-4.764	1.157×10^{-1}
19.7541	1.866×10^{1}	-1.096	-3.972	-5.012	1.024×10^{-1}
20.0000	1.892×10^{1}	-1.078	-4.000	-5.040	9.854×10^{-2}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 17: Case (m).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	1.000×10^{1}	-3.954×10^{-16}	0.000	0.000	0.000
1.000	1.000×10^{1}	-3.254×10^{-7}	-1.109×10^{-15}	-1.315×10^{-5}	0.000
1.501	9.966	-3.360×10^{-2}	1.781×10^{-14}	-1.184	8.867×10^{-4}
2.001	8.711	-1.289	-1.956×10^{-12}	-3.135×10^{1}	1.342×10^{-1}
2.501	7.964	-2.036	-7.008×10^{-11}	-5.515×10^{1}	2.184×10^{-1}
2.999	8.007	-1.993	-6.102×10^{-14}	-5.240×10^{1}	2.193×10^{-1}
3.499	8.327	-1.673	-9.622×10^{-12}	-3.418×10^{1}	2.193×10^{-1}
4.000	9.099	-9.013×10^{-1}	-3.025×10^{-11}	3.974	2.193×10^{-1}
4.500	9.071	-9.288×10^{-1}	-1.506×10^{-13}	2.750	2.193×10^{-1}
5.000	8.728	-1.272	2.353×10^{-11}	-1.334×10^{1}	2.193×10^{-1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	2.000×10^{1}	-1.589×10^{-7}	-7.492×10^{-5}	-2.818×10^{-5}	0.000
1.000	1.997×10^{1}	-3.238×10^{-2}	-1.005×10^{1}	-6.385	1.252×10^{-2}
1.501	1.942×10^{1}	-5.802×10^{-1}	-2.000×10^{1}	-2.241×10^{1}	2.220×10^{-2}
2.001	1.897×10^{1}	-1.031	-2.000×10^{1}	-2.941×10^{1}	3.559×10^{-2}
2.501	1.854×10^{1}	-1.456	-2.000×10^{1}	-3.462×10^{1}	5.675×10^{-2}
2.999	1.845×10^{1}	-1.547	-2.000×10^{1}	-3.524×10^{1}	6.387×10^{-2}
3.499	1.895×10^{1}	-1.051	-2.000×10^{1}	-2.415×10^{1}	6.387×10^{-2}
4.000	1.937×10^{1}	-6.314×10^{-1}	-2.000×10^{1}	-1.524×10^{1}	6.387×10^{-2}
4.500	1.954×10^{1}	-4.593×10^{-1}	-2.000×10^{1}	-1.171×10^{1}	6.387×10^{-2}
5.000	1.909×10^{1}	-9.063×10^{-1}	-2.000×10^{1}	-2.102×10^{1}	6.387×10^{-2}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
10.0000	8.728	-1.272	2.353×10^{-11}	-1.334×10^{1}	2.193×10^{-1}
10.2459	9.033	-1.213	-2.123	-1.314×10^{1}	2.015×10^{-1}
10.9538	9.870	-1.083	-6.938	-1.767×10^{1}	1.808×10^{-1}
12.0547	1.109×10^{1}	-9.654×10^{-1}	-1.460×10^{1}	-2.012×10^{1}	1.487×10^{-1}
13.4419	1.254×10^{1}	-9.003×10^{-1}	-2.152×10^{1}	-2.224×10^{1}	1.198×10^{-1}
15.0196	1.414×10^{1}	-8.788×10^{-1}	-2.050×10^{1}	-2.234×10^{1}	9.592×10^{-2}
16.5581	1.568×10^{1}	-8.739×10^{-1}	-1.902×10^{1}	-2.179×10^{1}	8.113×10^{-2}
17.9453	1.707×10^{1}	-8.801×10^{-1}	-1.900×10^{1}	-2.188×10^{1}	6.988×10^{-2}
19.0462	1.815×10^{1}	-8.928×10^{-1}	-1.957×10^{1}	-2.159×10^{1}	6.543×10^{-2}
19.7541	1.885×10^{1}	-9.026×10^{-1}	-1.989×10^{1}	-2.116×10^{1}	6.427×10^{-2}
20.0000	1.909×10^{1}	-9.063×10^{-1}	-2.000×10^{1}	-2.102×10^{1}	6.387×10^{-2}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 18: Case (n).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	1.000×10^{1}	-1.534×10^{-16}	0.000	0.000	0.000
1.000	1.000×10^{1}	-6.978×10^{-15}	2.442×10^{-21}	-1.332×10^{-21}	0.000
1.501	1.000×10^{1}	-1.211×10^{-7}	4.043×10^{-15}	-6.863×10^{-14}	0.000
2.001	9.978	-2.222×10^{-2}	-9.321×10^{-12}	-1.338×10^{-8}	0.000
2.501	9.598	-4.017×10^{-1}	-5.530×10^{-11}	-2.570×10^{-7}	0.000
2.999	9.176	-8.241×10^{-1}	-1.874×10^{-12}	-5.686×10^{-7}	0.000
3.499	8.724	-1.276	-1.527×10^{-12}	-9.651×10^{-7}	0.000
4.000	8.237	-1.763	-7.167×10^{-12}	-1.000×10^{-6}	1.385×10^{-1}
4.500	7.389	-2.611	-1.728×10^{-13}	-1.000×10^{-6}	4.146×10^{-1}
5.000	6.230	-3.770	-1.272×10^{-12}	-1.000×10^{-6}	8.365×10^{-1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	2.000×10^{1}	-2.937×10^{-8}	-7.492×10^{-6}	-7.492×10^{-6}	0.000
1.000	1.999×10^{1}	-5.455×10^{-3}	-1.005	-1.005	0.000
1.501	1.991×10^{1}	-8.751×10^{-2}	-2.000	-2.000	0.000
2.001	1.985×10^{1}	-1.505×10^{-1}	-2.000	-2.000	0.000
2.501	1.981×10^{1}	-1.887×10^{-1}	-2.000	-2.000	0.000
2.999	1.979×10^{1}	-2.096×10^{-1}	-2.000	-2.000	0.000
3.499	1.963×10^{1}	-3.719×10^{-1}	-2.000	-2.000	0.000
4.000	1.948×10^{1}	-5.237×10^{-1}	-2.000	-2.000	0.000
4.500	1.935×10^{1}	-6.483×10^{-1}	-2.000	-2.000	0.000
5.000	1.925×10^{1}	-7.453×10^{-1}	-2.000	-2.000	0.000

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
10.0000	6.230	-3.770	-1.272×10^{-12}	-1.000×10^{-6}	8.365×10^{-1}
10.2459	6.819	-3.427	-5.794×10^{-1}	-5.794×10^{-1}	6.697×10^{-1}
10.9538	8.211	-2.742	-1.060	-1.060	3.693×10^{-1}
12.0547	9.954	-2.100	-1.071	-1.071	1.227×10^{-1}
13.4419	1.183×10^{1}	-1.610	-9.228×10^{-1}	-9.228×10^{-1}	0.000
15.0196	1.376×10^{1}	-1.255	-8.103×10^{-1}	-8.103×10^{-1}	0.000
16.5581	1.553×10^{1}	-1.025	-1.357	-1.357	0.000
17.9453	1.706×10^{1}	-8.864×10^{-1}	-2.154	-2.154	0.000
19.0462	1.824×10^{1}	-8.045×10^{-1}	-2.111	-2.111	0.000
19.7541	1.899×10^{1}	-7.597×10^{-1}	-2.029	-2.029	0.000
20.0000	1.925×10^{1}	-7.453×10^{-1}	-2.000	-2.000	0.000

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 19: Case (o).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	1.000×10^{1}	-1.534×10^{-16}	0.000	0.000	0.000
1.000	1.000×10^{1}	-6.978×10^{-15}	2.442×10^{-21}	-1.332×10^{-21}	0.000
1.501	1.000×10^{1}	-1.211×10^{-7}	4.043×10^{-15}	-6.863×10^{-14}	0.000
2.001	9.978	-2.222×10^{-2}	-9.321×10^{-12}	-1.338×10^{-8}	0.000
2.501	9.598	-4.017×10^{-1}	-5.530×10^{-11}	-2.570×10^{-7}	0.000
2.999	9.176	-8.241×10^{-1}	-1.874×10^{-12}	-5.686×10^{-7}	0.000
3.499	8.724	-1.276	-1.527×10^{-12}	-9.651×10^{-7}	0.000
4.000	8.237	-1.763	-7.191×10^{-12}	-1.108×10^{-6}	1.081×10^{-1}
4.500	7.389	-2.611	-1.955×10^{-13}	-1.335×10^{-6}	3.354×10^{-1}
5.000	6.230	-3.770	-1.058×10^{-12}	-1.709×10^{-6}	7.087×10^{-1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
0.500	2.000×10^{1}	-2.937×10^{-8}	-7.492×10^{-6}	-7.492×10^{-6}	0.000
1.000	1.999×10^{1}	-5.455×10^{-3}	-1.005	-1.005	0.000
1.501	1.991×10^{1}	-8.751×10^{-2}	-2.000	-2.000	0.000
2.001	1.985×10^{1}	-1.505×10^{-1}	-2.000	-2.000	0.000
2.501	1.981×10^{1}	-1.887×10^{-1}	-2.000	-2.000	0.000
2.999	1.979×10^{1}	-2.096×10^{-1}	-2.000	-2.000	0.000
3.499	1.963×10^{1}	-3.719×10^{-1}	-2.000	-2.000	0.000
4.000	1.948×10^{1}	-5.237×10^{-1}	-2.000	-2.000	0.000
4.500	1.935×10^{1}	-6.483×10^{-1}	-2.000	-2.000	0.000
5.000	1.925×10^{1}	-7.453×10^{-1}	-2.000	-2.000	0.000

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]	α
10.0000	6.230	-3.770	-1.058×10^{-12}	-1.709×10^{-6}	7.087×10^{-1}
10.2459	6.819	-3.427	-5.794×10^{-1}	-5.794×10^{-1}	5.577×10^{-1}
10.9538	8.211	-2.742	-1.060	-1.060	2.971×10^{-1}
12.0547	9.954	-2.100	-1.071	-1.071	9.556×10^{-2}
13.4419	1.183×10^{1}	-1.610	-9.228×10^{-1}	-9.228×10^{-1}	0.000
15.0196	1.376×10^{1}	-1.255	-8.103×10^{-1}	-8.103×10^{-1}	0.000
16.5581	1.553×10^{1}	-1.025	-1.357	-1.357	0.000
17.9453	1.706×10^{1}	-8.864×10^{-1}	-2.154	-2.154	0.000
19.0462	1.824×10^{1}	-8.045×10^{-1}	-2.111	-2.111	0.000
19.7541	1.899×10^{1}	-7.597×10^{-1}	-2.029	-2.029	0.000
20.0000	1.925×10^{1}	-7.453×10^{-1}	-2.000	-2.000	0.000

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 20: Case (p).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-3.882×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-1.002×10^{-9}	6.208×10^{-15}	-3.186×10^{-8}
1.501	1.000×10^{1}	-2.334×10^{-4}	-4.702×10^{-14}	-7.417×10^{-3}
2.002	9.993	-6.674×10^{-3}	-1.119×10^{-10}	-2.120×10^{-1}
2.502	9.991	-9.466×10^{-3}	-8.305×10^{-11}	-3.007×10^{-1}
2.998	9.988	-1.233×10^{-2}	1.376×10^{-10}	-3.914×10^{-1}
3.499	9.992	-8.183×10^{-3}	1.806×10^{-10}	-2.600×10^{-1}
3.999	9.995	-4.948×10^{-3}	8.191×10^{-11}	-1.572×10^{-1}
4.500	1.000×10^{1}	5.622×10^{-4}	4.522×10^{-13}	1.787×10^{-2}
5.000	9.999	-6.956×10^{-4}	-2.034×10^{-13}	-2.211×10^{-2}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-8.484×10^{-10}	-3.766×10^{-7}	-2.915×10^{-8}
1.001	2.000×10^{1}	-1.596×10^{-4}	-5.052×10^{-2}	-4.639×10^{-3}
1.501	2.000×10^{1}	-3.287×10^{-3}	-1.000×10^{-1}	-5.641×10^{-2}
2.002	1.999×10^{1}	-7.299×10^{-3}	-1.000×10^{-1}	-1.202×10^{-1}
2.502	1.999×10^{1}	-1.266×10^{-2}	-1.000×10^{-1}	-2.053×10^{-1}
2.998	1.999×10^{1}	-1.318×10^{-2}	-1.000×10^{-1}	-2.136×10^{-1}
3.499	1.999×10^{1}	-1.123×10^{-2}	-1.000×10^{-1}	-1.826×10^{-1}
3.999	1.999×10^{1}	-5.425×10^{-3}	-1.000×10^{-1}	-9.038×10^{-2}
4.500	2.000×10^{1}	-2.191×10^{-3}	-1.000×10^{-1}	-3.898×10^{-2}
5.000	2.000×10^{1}	-8.624×10^{-4}	-1.000×10^{-1}	-1.787×10^{-2}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	9.999	-6.956×10^{-4}	-2.034×10^{-13}	-2.211×10^{-2}
10.2459	1.025×10^{1}	-6.902×10^{-4}	1.086×10^{-2}	-2.096×10^{-2}
10.9538	1.095×10^{1}	-6.331×10^{-4}	3.910×10^{-2}	-1.674×10^{-2}
12.0547	1.205×10^{1}	-4.462×10^{-4}	6.824×10^{-2}	-8.924×10^{-3}
13.4419	1.344×10^{1}	-1.744×10^{-4}	5.084×10^{-2}	-2.009×10^{-3}
15.0196	1.502×10^{1}	-6.597×10^{-5}	-2.419×10^{-3}	-1.497×10^{-3}
16.5581	1.656×10^{1}	-1.596×10^{-4}	-3.712×10^{-2}	-4.609×10^{-3}
17.9453	1.794×10^{1}	-3.663×10^{-4}	-6.361×10^{-2}	-9.137×10^{-3}
19.0462	1.905×10^{1}	-6.050×10^{-4}	-8.352×10^{-2}	-1.358×10^{-2}
19.7541	1.975×10^{1}	-7.917×10^{-4}	-9.583×10^{-2}	-1.673×10^{-2}
20.0000	2.000×10^{1}	-8.624×10^{-4}	-1.000×10^{-1}	-1.787×10^{-2}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 21: Case (q).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-1.124×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-3.956×10^{-10}	3.946×10^{-14}	-1.244×10^{-8}
1.501	1.000×10^{1}	-1.011×10^{-4}	-3.442×10^{-15}	-3.180×10^{-3}
2.002	9.993	-6.833×10^{-3}	-3.301×10^{-10}	-2.147×10^{-1}
2.502	9.990	-9.808×10^{-3}	-1.464×10^{-10}	-3.081×10^{-1}
2.998	9.987	-1.251×10^{-2}	-1.620×10^{-10}	-3.930×10^{-1}
3.499	9.991	-8.527×10^{-3}	5.806×10^{-10}	-2.679×10^{-1}
3.999	9.996	-4.246×10^{-3}	2.737×10^{-14}	-1.335×10^{-1}
4.500	1.000×10^{1}	2.402×10^{-4}	3.466×10^{-13}	7.553×10^{-3}
5.000	1.000×10^{1}	8.530×10^{-4}	-3.309×10^{-12}	2.682×10^{-2}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-9.053×10^{-10}	-3.766×10^{-7}	-5.016×10^{-8}
1.001	2.000×10^{1}	-1.701×10^{-4}	-5.052×10^{-2}	-7.496×10^{-3}
1.501	2.000×10^{1}	-3.394×10^{-3}	-1.000×10^{-1}	-6.291×10^{-2}
2.002	1.999×10^{1}	-7.235×10^{-3}	-1.000×10^{-1}	-1.233×10^{-1}
2.502	1.999×10^{1}	-1.239×10^{-2}	-1.000×10^{-1}	-2.044×10^{-1}
2.998	1.999×10^{1}	-1.292×10^{-2}	-1.000×10^{-1}	-2.127×10^{-1}
3.499	1.999×10^{1}	-1.085×10^{-2}	-1.000×10^{-1}	-1.801×10^{-1}
3.999	1.999×10^{1}	-5.494×10^{-3}	-1.000×10^{-1}	-9.592×10^{-2}
4.500	2.000×10^{1}	-1.645×10^{-3}	-1.000×10^{-1}	-3.542×10^{-2}
5.000	2.000×10^{1}	-1.297×10^{-3}	-1.000×10^{-1}	-2.994×10^{-2}

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	1.000×10^{1}	8.530×10^{-4}	-3.309×10^{-12}	2.682×10^{-2}
10.2459	1.025×10^{1}	8.449×10^{-4}	-9.904×10^{-3}	2.498×10^{-2}
10.9538	1.095×10^{1}	7.756×10^{-4}	-3.901×10^{-2}	1.854×10^{-2}
12.0547	1.206×10^{1}	5.333×10^{-4}	-7.889×10^{-2}	6.378×10^{-3}
13.4419	1.344×10^{1}	1.403×10^{-4}	-7.420×10^{-2}	-3.801×10^{-3}
15.0196	1.502×10^{1}	-1.910×10^{-4}	-5.181×10^{-2}	-8.944×10^{-3}
16.5581	1.656×10^{1}	-4.518×10^{-4}	-5.299×10^{-2}	-1.364×10^{-2}
17.9453	1.794×10^{1}	-7.273×10^{-4}	-6.822×10^{-2}	-1.926×10^{-2}
19.0462	1.905×10^{1}	-1.006×10^{-3}	-8.481×10^{-2}	-2.470×10^{-2}
19.7541	1.975×10^{1}	-1.217×10^{-3}	-9.610×10^{-2}	-2.855×10^{-2}
20.0000	2.000×10^{1}	-1.297×10^{-3}	-1.000×10^{-1}	-2.994×10^{-2}

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 22: Case (r).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-7.046×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-2.006×10^{-7}	-2.092×10^{-15}	-6.376×10^{-6}
1.501	9.959	-4.061×10^{-2}	-3.914×10^{-12}	-1.288
2.002	8.675	-1.325	-2.775×10^{-9}	-3.891×10^{1}
2.502	8.056	-1.944	-6.830×10^{-12}	-5.499×10^{1}
2.998	7.369	-2.631	-1.387×10^{-9}	-7.129×10^{1}
3.499	7.887	-2.113	8.590×10^{-10}	-5.913×10^{1}
3.999	8.575	-1.425	-8.315×10^{-14}	-4.162×10^{1}
4.500	9.658	-3.420×10^{-1}	3.300×10^{-9}	-1.065×10^{1}
5.000	1.018×10^{1}	1.768×10^{-1}	-1.396×10^{-13}	5.678

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-1.697×10^{-7}	-7.531×10^{-5}	-5.831×10^{-6}
1.001	1.997×10^{1}	-3.226×10^{-2}	-1.010×10^{1}	-9.754×10^{-1}
1.501	1.934×10^{1}	-6.618×10^{-1}	-2.000×10^{1}	-1.186×10^{1}
2.002	1.859×10^{1}	-1.414	-2.000×10^{1}	-2.360×10^{1}
2.502	1.755×10^{1}	-2.452	-2.000×10^{1}	-3.875×10^{1}
2.998	1.730×10^{1}	-2.698	-2.000×10^{1}	-4.216×10^{1}
3.499	1.745×10^{1}	-2.555	-2.000×10^{1}	-4.018×10^{1}
3.999	1.836×10^{1}	-1.643	-2.000×10^{1}	-2.704×10^{1}
4.500	1.927×10^{1}	-7.337×10^{-1}	-2.000×10^{1}	-1.301×10^{1}
5.000	1.982×10^{1}	-1.833×10^{-1}	-2.000×10^{1}	-4.028

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	1.018×10^{1}	1.768×10^{-1}	-1.396×10^{-13}	5.678
10.2459	1.042×10^{1}	1.755×10^{-1}	-2.636	5.427
10.9538	1.111×10^{1}	1.610×10^{-1}	-9.016	4.442
12.0547	1.217×10^{1}	1.169×10^{-1}	-1.398×10^{1}	2.596
13.4419	1.350×10^{1}	5.720×10^{-2}	-1.098×10^{1}	9.098×10^{-1}
15.0196	1.503×10^{1}	1.355×10^{-2}	-7.776	-4.639×10^{-2}
16.5581	1.653×10^{1}	-2.656×10^{-2}	-9.667	-9.511×10^{-1}
17.9453	1.787×10^{1}	-7.562×10^{-2}	-1.336×10^{1}	-1.995
19.0462	1.892×10^{1}	-1.276×10^{-1}	-1.687×10^{1}	-3.014
19.7541	1.959×10^{1}	-1.680×10^{-1}	-1.920×10^{1}	-3.756
20.0000	1.982×10^{1}	-1.833×10^{-1}	-2.000×10^{1}	-4.028

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 23: Case (s).

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	1.000×10^{1}	-2.670×10^{-17}	0.000	0.000
1.001	1.000×10^{1}	-7.926×10^{-8}	6.384×10^{-14}	-2.492×10^{-6}
1.501	9.981	-1.856×10^{-2}	-1.474×10^{-13}	-5.828×10^{-1}
2.002	8.663	-1.337	-2.027×10^{-11}	-3.833×10^{1}
2.502	7.965	-2.035	2.341×10^{-11}	-5.556×10^{1}
2.998	7.497	-2.503	-1.048×10^{-10}	-6.613×10^{1}
3.499	7.738	-2.262	6.521×10^{-11}	-6.079×10^{1}
3.999	8.845	-1.155	8.922×10^{-11}	-3.353×10^{1}
4.500	9.455	-5.447×10^{-1}	7.462×10^{-10}	-1.649×10^{1}
5.000	1.031×10^{1}	3.133×10^{-1}	6.736×10^{-10}	1.006×10^{1}

(1) Inner surface $r_0 = r_i$

Time [μs]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
0.500	2.000×10^{1}	-1.811×10^{-7}	-7.531×10^{-5}	-1.003×10^{-5}
1.001	1.997×10^{1}	-3.446×10^{-2}	-1.010×10^{1}	-1.596
1.501	1.931×10^{1}	-6.861×10^{-1}	-2.000×10^{1}	-1.335×10^{1}
2.002	1.859×10^{1}	-1.409	-2.000×10^{1}	-2.434×10^{1}
2.502	1.763×10^{1}	-2.370	-2.000×10^{1}	-3.789×10^{1}
2.998	1.734×10^{1}	-2.663	-2.000×10^{1}	-4.180×10^{1}
3.499	1.766×10^{1}	-2.338	-2.000×10^{1}	-3.746×10^{1}
3.999	1.830×10^{1}	-1.699	-2.000×10^{1}	-2.855×10^{1}
4.500	1.936×10^{1}	-6.404×10^{-1}	-2.000×10^{1}	-1.264×10^{1}
5.000	1.964×10^{1}	-3.561×10^{-1}	-2.000×10^{1}	-8.096

(2) Outer surface $r_0 = r_o$

r_0[mm]	r[mm]	u_r[mm]	σ_{rr}[GPa]	$\sigma_{\theta\theta}$[GPa]
10.0000	1.031×10^{1}	3.133×10^{-1}	6.736×10^{-10}	1.006×10^{1}
10.2459	1.056×10^{1}	3.114×10^{-1}	-8.930×10^{-1}	9.698
10.9538	1.126×10^{1}	3.017×10^{-1}	-3.393	8.586
12.0547	1.233×10^{1}	2.745×10^{-1}	-7.186	6.712
13.4419	1.366×10^{1}	2.183×10^{-1}	-1.235×10^{1}	4.070
15.0196	1.513×10^{1}	1.142×10^{-1}	-2.083×10^{1}	2.145×10^{-1}
16.5581	1.652×10^{1}	-3.901×10^{-2}	-2.724×10^{1}	-4.098
17.9453	1.776×10^{1}	-1.872×10^{-1}	-2.553×10^{1}	-6.547
19.0462	1.876×10^{1}	-2.846×10^{-1}	-2.210×10^{1}	-7.489
19.7541	1.942×10^{1}	-3.386×10^{-1}	-2.049×10^{1}	-7.956
20.0000	1.964×10^{1}	-3.561×10^{-1}	-2.000×10^{1}	-8.096

(3) Radial distributions evaluated at final time $t = 5\mu s$.

Table 24: Case (t).