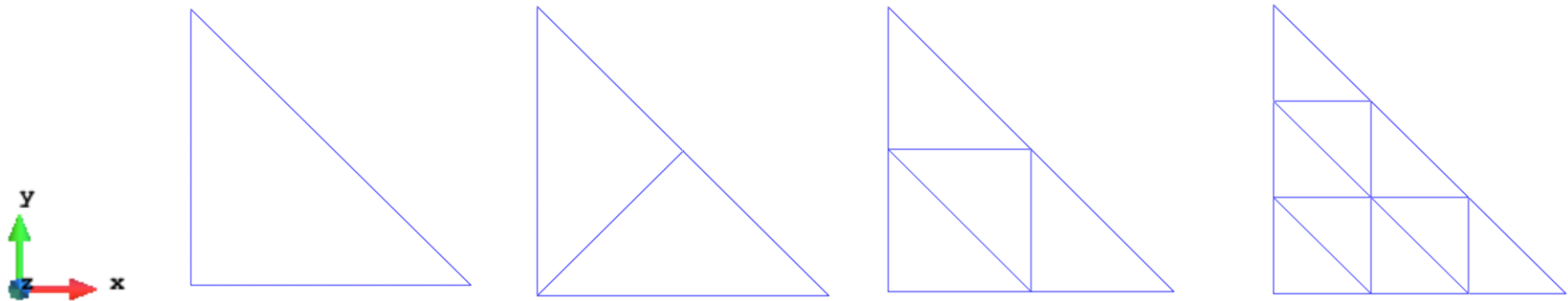


Prelim. Investigation into DSGc3 element

Meshes considered:



Outer triangle points remain [0,0], [0,1], [1,0] across all meshes

Test setup:

No forces applied

Displacements:

w1	<i>prescribed</i>	0.5
w2	<i>prescribed</i>	1
w3	<i>prescribed</i>	0.5
phi x 1	<i>prescribed</i>	1
phi x 2		<i>unknown</i>
phi x 3	<i>prescribed</i>	1.5
phi y 1	<i>prescribed</i>	1
phi y 2		<i>unknown</i>
phi y 3		<i>unknown</i>

All membrane DOFs fixed

Normal CST entries for membrane and bending B-matrix entries, as per original DSG element

Material matrix shear stabilization disabled

No corotational transformation used

Cases considered:

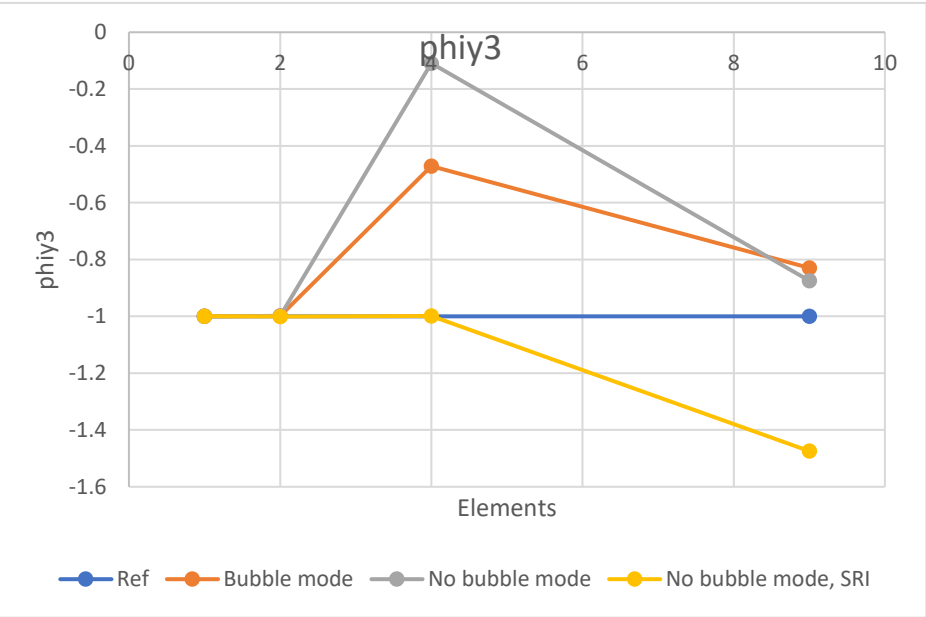
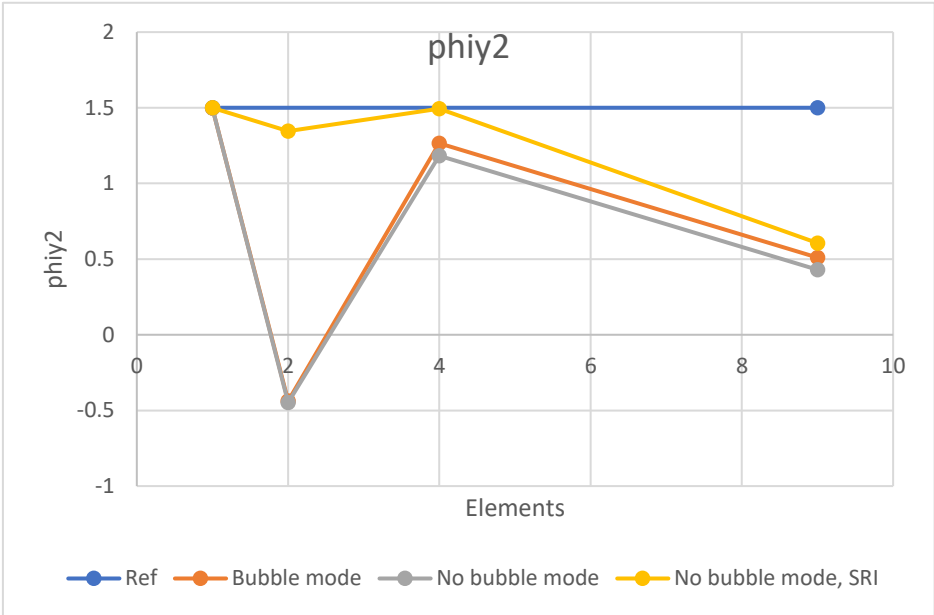
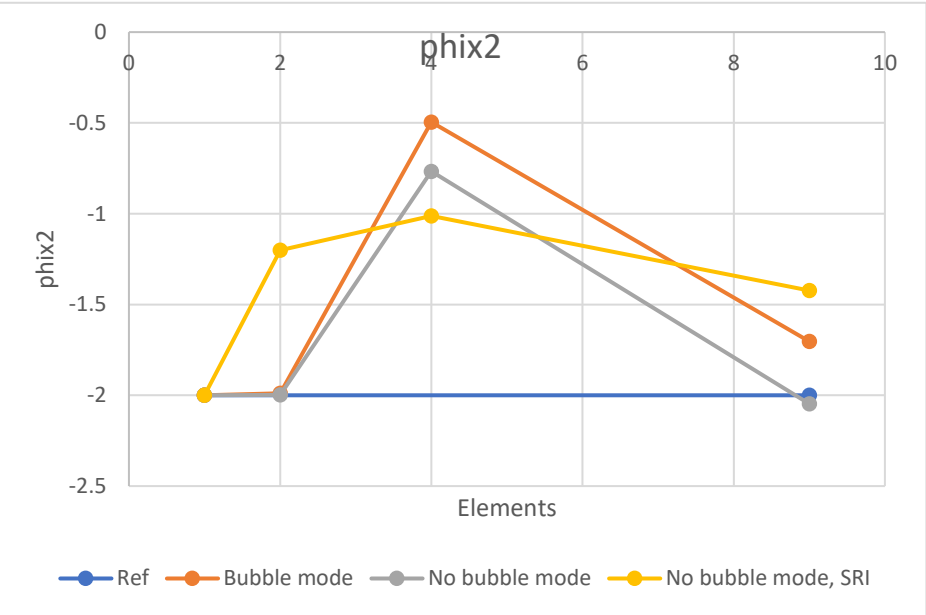
DSGc3 with bubble mode

DSGc3 without bubble mode

DSGc3 without bubble mode, with SRI

Reference is DSG_3_20131109 maple file

Result graphs:



Result data:

Bubble mode

Divisions	Elements	w1	phix1	phiy1	w2	phix2	phiy2	w3	phix3	phiy3
Ref	1	0.50	1.00	1.00	1.00	-2.00	1.50	0.50	1.50	-1.00
0	1	0.50	1.00	1.00	1.00	-2.00	1.50	0.50	1.50	-1.00
1	2	0.50	1.00	1.00	1.00	-1.99	-0.44	0.50	1.50	-1.00
2	4	0.50	1.00	1.00	1.00	-0.50	1.26	0.50	1.50	-0.47
3	9	0.50	1.00	1.00	1.00	-1.70	0.51	0.50	1.50	-0.83

THESE MUST BE ZERO TO
FULFILL KT CONDITIONS

C	$\alpha 8$	$\alpha 9$
0.00	0.00	0.00
0.00	0.00	0.00
1.94	0.01	0.00
0.24	0.75	0.26
0.99	0.15	0.09

No bubble mode

Divisions	Elements	w1	phix1	phiy1	w2	phix2	phiy2	w3	phix3	phiy3
Ref	1	0.50	1.00	1.00	1.00	-2.00	1.50	0.50	1.50	-1.00
0	1	0.50	1.00	1.00	1.00	-2.00	1.50	0.50	1.50	-1.00
1	2	0.50	1.00	1.00	1.00	-2.00	-0.45	0.50	1.50	-1.00
2	4	0.50	1.00	1.00	1.00	-0.77	1.18	0.50	1.50	-0.11
3	9	0.50	1.00	1.00	1.00	-2.05	0.43	0.50	1.50	-0.87

C	$\alpha 8$	$\alpha 9$
0.00	0.00	0.00
0.00	0.00	0.00
1.95	0.00	0.00
0.32	0.62	0.45
1.07	-0.02	0.06

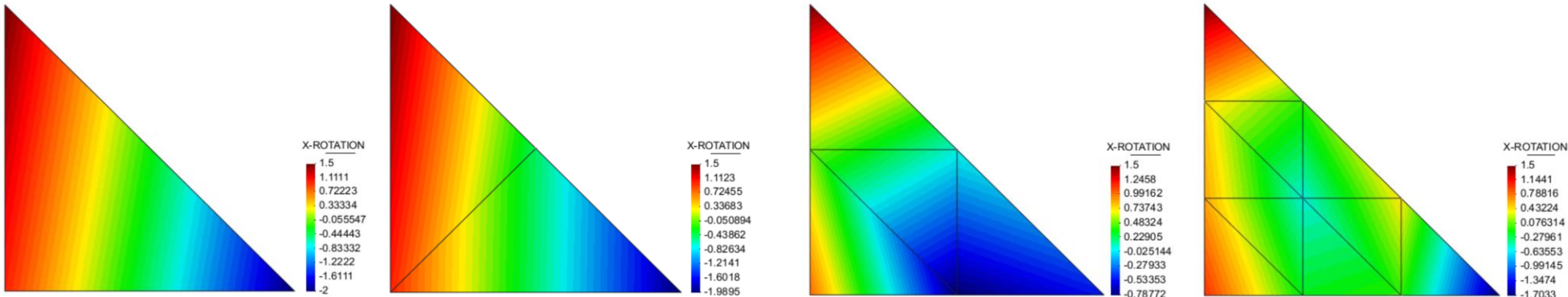
No bubble mode, SRI

Divisions	Elements	w1	phix1	phiy1	w2	phix2	phiy2	w3	phix3	phiy3
Ref	1	0.50	1.00	1.00	1.00	-2.00	1.50	0.50	1.50	-1.00
0	1	0.50	1.00	1.00	1.00	-2.00	1.50	0.50	1.50	-1.00
1	2	0.50	1.00	1.00	1.00	-1.20	1.35	0.50	1.50	-1.00
2	4	0.50	1.00	1.00	1.00	-1.01	1.49	0.50	1.50	-1.47
3	9	0.50	1.00	1.00	1.00	-1.42	0.61	0.50	1.50	-1.24

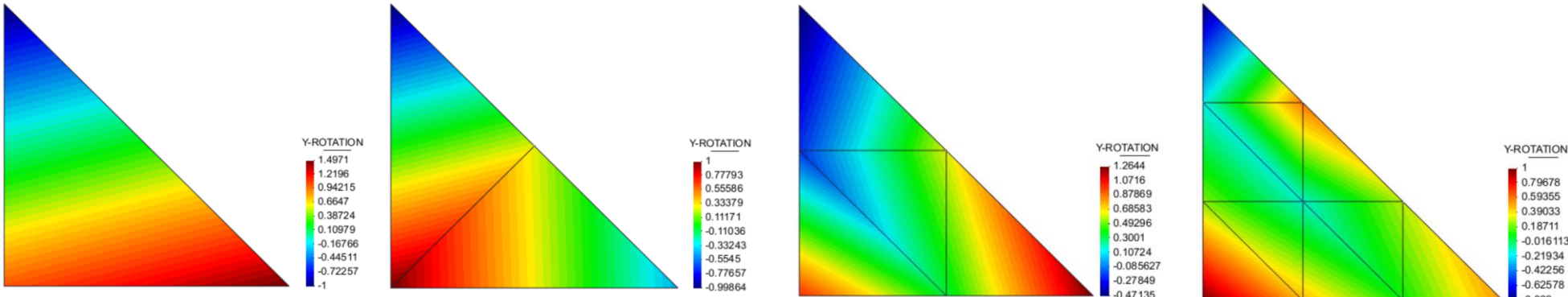
C	$\alpha 8$	$\alpha 9$
0.00	0.00	0.00
0.00	0.00	0.00
0.15	0.40	0.00
0.01	0.49	-0.24
0.89	0.29	-0.12

Contours of DSGc3 with bubble mode

X rotation:

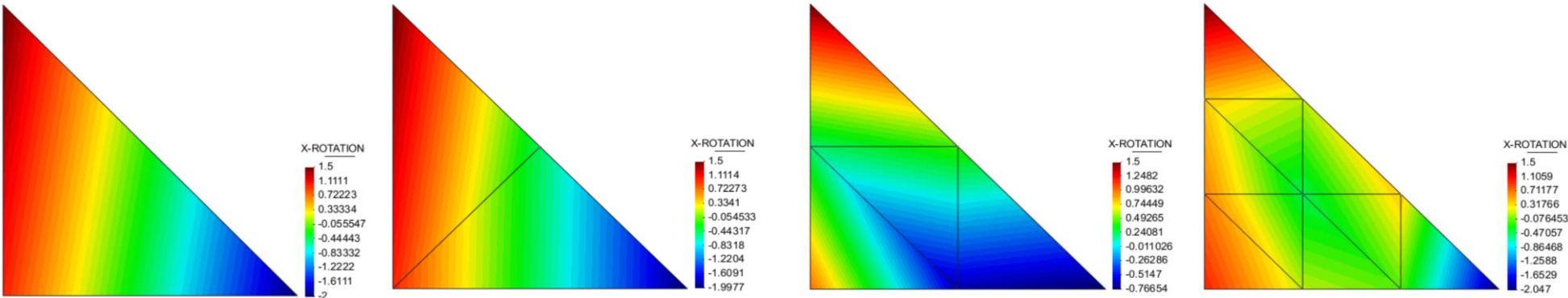


Y rotation

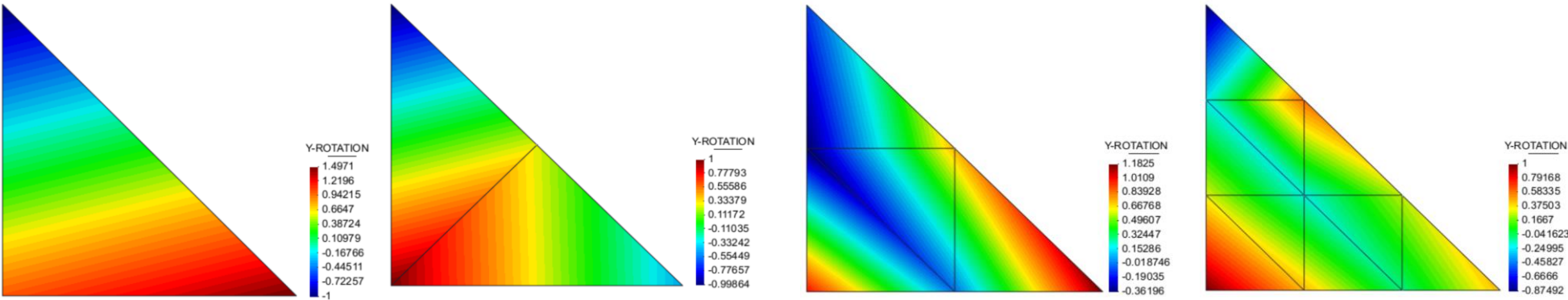


Contours of DSGc3 with no bubble mode

X rotation:

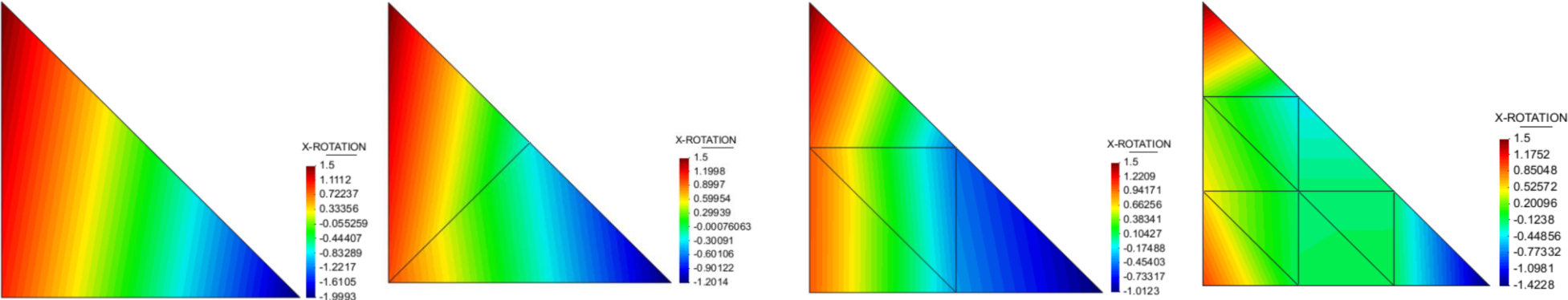


Y rotation:



Contours of DSGc3 with no bubble mode and SRI

X rotation



Y rotation

