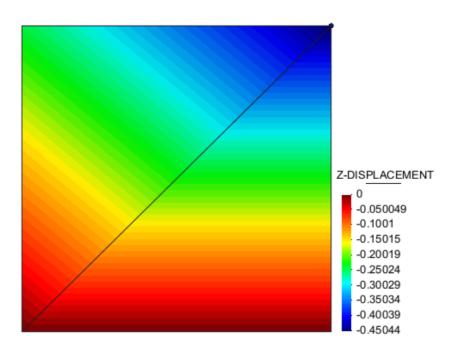
# Rectangle test case:

Square is 1x1, bottom edge fully fixed, all rot\_Z fixed, point load of  $F_z = -0.01$  applied to top right corner E = 1000, nu = 0.0, t = 0.05, L/t = 20

# Kratos thin element



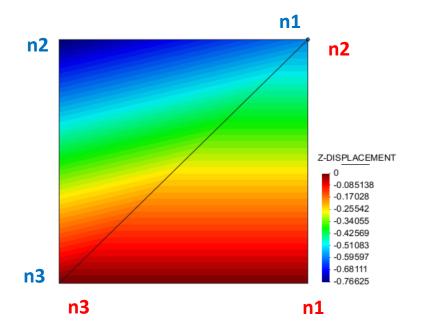
## default node ordering

Element 1: bottom right

Node 1: bottom right Node 2: top right Node 3: bottom left (anticlockwise ordering)

Element 2: top left

Node 1: top right Node 2: top left Node 3: bottom left (anticlockwise ordering)



#### DSGc3 element 1 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs! -1.74 | 0.00 -1.74 0.00 -1.74 6.94 -3.47 l -3.47 -1.74 1.74 -1.74 -3.47 -1.74 6.94 -3.47 1.74 3.47 0.00 -1.74 -1.74 1.74 -3.47 -3.47 6.94 0.00 1.74 3.47 1.74 0.00 0.87 0.87 0.00 0.00 0.00 -1.74 0.00 3.47 -1.74 -1.74 0.87 1.74 0.87 0.00 -0.87 -0.87 0.00 1.74 -1.74 0.00 -0.87 0.00 0.87 -0.87 0.87 1.74 0.00 -1.74 0.00 0.00 0.00 0.87 0.00 0.87 0.00 -1.74 1.74 0.00 -0.87 -0.87 0.00 0.87 0.87

-0.87

-0.87

0.87

0.87

1.74

0.00

## DSGc3 element 2 shear stiffness matrix

3.47

-1.74

-1.74

		=								
ı	Printing elem	ment shear	K to Bletzin	ger Maple D	OFs!					
	10.42	-6.94	-3.47	-1.74	-3.47	-1.74	-3.47	1.74	-1.74	
	-6.94	17.36	-10.42	6.94	8.68	1.74	-3.47	-1.74	-5.21	
	-3.47	-10.42	13.89	-5.21	-5.21	0.00	6.94	-0.00	6.94	
	-1.74	6.94	-5.21	3.47	3.47	0.00	-2.60	0.00	-2.60	
	-3.47	8.68	-5.21	3.47	4.34	0.87	-1.74	-0.87	-2.60	
	-1.74	1.74	0.00	0.00	0.87	0.87	0.87	-0.87	0.00	
	-3.47	-3.47	6.94	-2.60	-1.74	0.87	4.34	-0.87	3.47	
	1.74	-1.74	-0.00	0.00	-0.87	-0.87	-0.87	0.87	-0.00	
	-1.74	-5.21	6.94	-2.60	-2.60	0.00	3.47	-0.00	3.47	

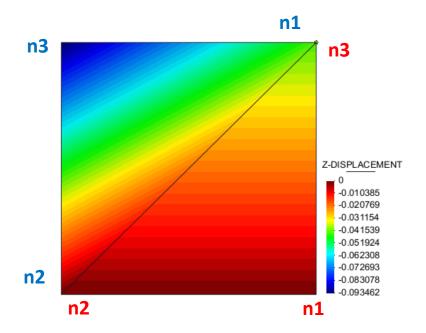
# default node ordering reversed

Element 1: bottom right

> Node 1: bottom right Node 2: bottom left Node 3: top right (clockwise ordering)

# Element 2: top left

Node 1: top right bottom left Node 2: Node 3: top left (clockwise ordering)



#### DSGc3 element 1 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs!

6.94	-3.47	-3.47	-1.74	-1.74	0.00	-1.74	0.00	-1.74	
-3.47	6.94	-3.47	1.74	3.47	1.74	0.00	-1.74	-1.74	
-3.47	-3.47	6.94	0.00	-1.74	-1.74	1.74	1.74	3.47	
-1.74	1.74	0.00	0.87	0.87	0.00	0.00	0.00	0.00	
-1.74	3.47	-1.74	0.87	1.74	0.87	0.00	-0.87	-0.87	
0.00	1.74	-1.74	0.00	0.87	0.87	0.00	-0.87	-0.87	
-1.74	0.00	1.74	0.00	0.00	0.00	0.87	0.00	0.87	
0.00	-1.74	1.74	0.00	-0.87	-0.87	0.00	0.87	0.87	
-1.74	-1.74	3.47	0.00	-0.87	-0.87	0.87	0.87	1.74	

#### DSGc3 element 2 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs!

	THICTH'S CT	incric Sricar	K CO DICCII	inger hapte	DOI 3.				
	10.42	-3.47	-6.94	0.00	-1.74	-1.74	-5.21	1.74	-3.47
	-3.47	13.89	-10.42	4.34	6.94	2.60	-2.60	-2.60	-5.21
	-6.94	-10.42	17.36	-4.34	-5.21	-0.87	7.81	0.87	8.68
Ì	0.00	4.34	-4.34	1.74	2.17	0.43	-1.74	-0.43	-2.17
	-1.74	6.94	-5.21	2.17	3.47	1.30	-1.30	-1.30	-2.60
	-1.74	2.60	-0.87	0.43	1.30	0.87	0.43	-0.87	-0.43
Ì	-5.21	-2.60	7.81	-1.74	-1.30	0.43	4.34	-0.43	3.91
	1.74	-2.60	0.87	-0.43	-1.30	-0.87	-0.43	0.87	0.43
	-3.47	-5.21	8.68	-2.17	-2.60	-0.43	3.91	0.43	4.34

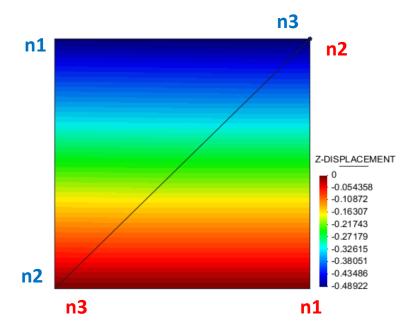
# changed so n1 of e2 is at top left corner

Element 1: bottom right

Node 1: bottom right Node 2: top right Node 3: bottom left (anticlockwise ordering)

Element 2: top left

Node 1: top left
Node 2: bottom left
Node 3: top right
(anticlockwise ordering)



## DSGc3 element 1 shear stiffness matrix

ı	Printing ele	ement shear	K to Bletzi	inger Maple	DOFs!					
	6.94	-3.47	-3.47	-1.74	-1.74	0.00	-1.74	0.00	-1.74	
	-3.47	6.94	-3.47	1.74	3.47	1.74	0.00	-1.74	-1.74	
	-3.47	-3.47	6.94	0.00	-1.74	-1.74	1.74	1.74	3.47	
	-1.74	1.74	0.00	0.87	0.87	0.00	0.00	0.00	0.00	
	-1.74	3.47	-1.74	0.87	1.74	0.87	0.00	-0.87	-0.87	
	0.00	1.74	-1.74	0.00	0.87	0.87	0.00	-0.87	-0.87	
	-1.74	0.00	1.74	0.00	0.00	0.00	0.87	0.00	0.87	
	0.00	-1.74	1.74	0.00	-0.87	-0.87	0.00	0.87	0.87	
	-1.74	-1.74	3.47	0.00	-0.87	-0.87	0.87	0.87	1.74	

Printing ele	ement shear	K to Bletzi	nger Maple	DOFs!				
6.94	-3.47	-3.47	-1.74	-1.74	0.00	-1.74	0.00	-1.74
-3.47	6.94	-3.47	1.74	3.47	1.74	0.00	-1.74	-1.74
-3.47	-3.47	6.94	0.00	-1.74	-1.74	1.74	1.74	3.47
-1.74	1.74	0.00	0.87	0.87	0.00	0.00	0.00	0.00
-1.74	3.47	-1.74	0.87	1.74	0.87	0.00	-0.87	-0.87
0.00	1.74	-1.74	0.00	0.87	0.87	0.00	-0.87	-0.87
-1.74	0.00	1.74	0.00	0.00	0.00	0.87	0.00	0.87
0.00	-1.74	1.74	0.00	-0.87	-0.87	0.00	0.87	0.87
1 -1 74	-1 74	3 47	9 99	-0 87	-0 87	9 87	0 87	1 74

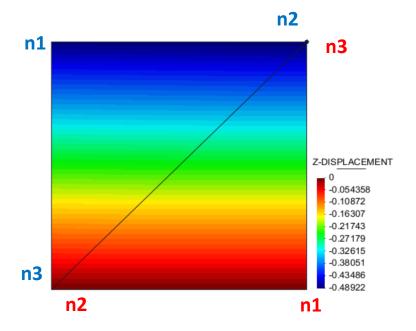
Element 1: bottom right

Node 1: bottom right
Node 2: bottom left
Node 3: top right
(clockwise ordering)

## Element 2: top left

Node 1: top left
Node 2: top right
Node 3: bottom left
(clockwise ordering)

changed so n1 of e2 is at top left corner and nodal ordering reversed



#### DSGc3 element 1 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs! 6.94 -3.47 -3.47 -1.74 -1.74 0.00 -1.74 0.00 -1.74 -3.47 6.94 -3.47 1.74 3.47 1.74 0.00 -1.74 -1.74 -3.47 -3.47 6.94 0.00 -1.74 -1.74 1.74 1.74 3.47 -1.74 1.74 0.00 0.87 0.87 0.00 0.00 0.00 0.00 -1.74 3.47 -1.74 0.87 1.74 0.87 0.00 -0.87 -0.87 0.00 1.74 -1.74 0.00 0.87 0.87 0.00 -0.87 -0.87 -1.74 0.00 1.74 0.00 0.00 0.00 0.87 0.00 0.87 0.00 -1.74 1.74 0.00 -0.87 -0.87 0.00 0.87 0.87 -1.74 | -1.74 3.47 0.00 -0.87 -0.87 0.87 0.87 1.74

ı	Printing elem	ment shear k	( to Bletzin	ger Maple D	OOFs!				
	6.94	-3.47	-3.47	-1.74	-1.74	0.00	-1.74	0.00	-1.74
	-3.47	6.94	-3.47	1.74	3.47	1.74	0.00	-1.74	-1.74
	-3.47	-3.47	6.94	0.00	-1.74	-1.74	1.74	1.74	3.47
	-1.74	1.74	0.00	0.87	0.87	0.00	0.00	0.00	0.00
	-1.74	3.47	-1.74	0.87	1.74	0.87	0.00	-0.87	-0.87
	0.00	1.74	-1.74	0.00	0.87	0.87	0.00	-0.87	-0.87
	-1.74	0.00	1.74	0.00	0.00	0.00	0.87	0.00	0.87
	0.00	-1.74	1.74	0.00	-0.87	-0.87	0.00	0.87	0.87
	-1.74	-1.74	3.47	0.00	-0.87	-0.87	0.87	0.87	1.74

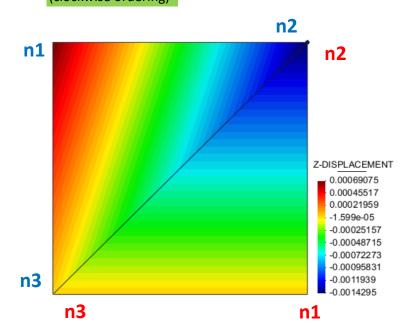
Element 1: bottom right

Node 1: bottom right Node 2: top right Node 3: bottom left (anticlockwise ordering)

Element 2: top left

Node 1: top left
Node 2: top right
Node 3: bottom left
(clockwise ordering)

changed so n1 of e2 is at top left corner and nodal ordering reversed on 1 element symmetry about the diagonal created



#### DSGc3 element 1 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs! 6.94 -3.47 -3.47 -1.74 -1.74 0.00 -1.74 0.00 -1.74 -3.47 6.94 -3.47 1.74 3.47 1.74 0.00 -1.74 -1.74 -3.47 -3.47 0.00 -1.74 -1.74 1.74 3.47 6.94 1.74 -1.74 1.74 0.00 0.00 0.87 0.87 0.00 0.00 0.00 3.47 -1.74 -1.74 0.87 1.74 0.87 0.00 -0.87 -0.87 1.74 0.00 -1.74 0.00 0.87 0.87 0.00 -0.87 -0.87 -1.74 0.00 1.74 0.00 0.00 0.00 0.87 0.00 0.87 -1.74 1.74 0.00 -0.87 0.00 0.87 0.87 0.00 -0.87 -1.74 -1.74 3.47 0.00 -0.87 -0.87 0.87 I 0.87 1.74

2000 0.0	= 5.	icai stiiii	coo macin	•					
Printing ele	ment shear	K to Bletzi	inger Maple	DOFs!					
6.94	-3.47	-3.47	-1.74	-1.74	0.00	-1.74	0.00	-1.74	
-3.47	6.94	-3.47	1.74	3.47	1.74	0.00	-1.74	-1.74	
-3.47	-3.47	6.94	0.00	-1.74	-1.74	1.74	1.74	3.47	
-1.74	1.74	0.00	0.87	0.87	0.00	0.00	0.00	0.00	
-1.74	3.47	-1.74	0.87	1.74	0.87	0.00	-0.87	-0.87	
0.00	1.74	-1.74	0.00	0.87	0.87	0.00	-0.87	-0.87	
-1.74	0.00	1.74	0.00	0.00	0.00	0.87	0.00	0.87	
0.00	-1.74	1.74	0.00	-0.87	-0.87	0.00	0.87	0.87	
-1.74	-1.74	3.47	0.00	-0.87	-0.87	0.87	0.87	1.74	

# changed so e1 n2 is at top right

Element 1: bottom right

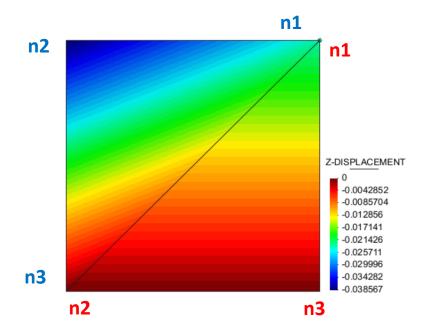
Node 1: top right

Node 2: bottom left Node 3: bottom right

(anticlockwise ordering)

Element 2: top left

Node 1: top right
Node 2: top left
Node 3: bottom left
(anticlockwise ordering)



#### DSGc3 element 1 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs!

- 1	LITHETHE ETC	menc snear	K to bretzi	nger mapie	DOI 3:				
	10.42	-3.47	-6.94	0.00	-1.74	-1.74	-5.21	1.74	-3.47
	-3.47	13.89	-10.42	4.34	6.94	2.60	-2.60	-2.60	-5.21
	-6.94	-10.42	17.36	-4.34	-5.21	-0.87	7.81	0.87	8.68
	0.00	4.34	-4.34	1.74	2.17	0.43	-1.74	-0.43	-2.17
	-1.74	6.94	-5.21	2.17	3.47	1.30	-1.30	-1.30	-2.60
	-1.74	2.60	-0.87	0.43	1.30	0.87	0.43	-0.87	-0.43
	-5.21	-2.60	7.81	-1.74	-1.30	0.43	4.34	-0.43	3.91
	1.74	-2.60	0.87	-0.43	-1.30	-0.87	-0.43	0.87	0.43
	-3.47	-5.21	8.68	-2.17	-2.60	-0.43	3.91	0.43	4.34

#### DSGc3 element 2 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs!

- 1	LI THETHE ETC	ilenc snear	K to bretzri	igei Mapie	DOI 3:					
	10.42	-6.94	-3.47	-1.74	-3.47	-1.74	-3.47	1.74	-1.74	
	-6.94	17.36	-10.42	6.94	8.68	1.74	-3.47	-1.74	-5.21	
	-3.47	-10.42	13.89	-5.21	-5.21	0.00	6.94	-0.00	6.94	
	-1.74	6.94	-5.21	3.47	3.47	0.00	-2.60	0.00	-2.60	
	-3.47	8.68	-5.21	3.47	4.34	0.87	-1.74	-0.87	-2.60	
	-1.74	1.74	0.00	0.00	0.87	0.87	0.87	-0.87	0.00	
	-3.47	-3.47	6.94	-2.60	-1.74	0.87	4.34	-0.87	3.47	
	1.74	-1.74	-0.00	0.00	-0.87	-0.87	-0.87	0.87	-0.00	
	-1.74	-5.21	6.94	-2.60	-2.60	0.00	3.47	-0.00	3.47	

changed so e1 n2 is at top right and nodal ordering reversed

Element 1: bottom right

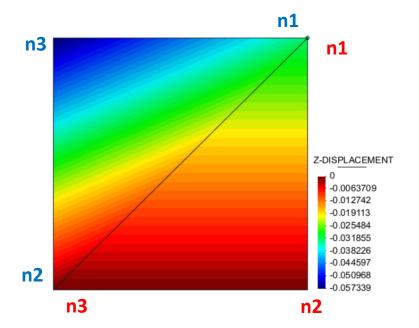
Node 1: top right

Node 2: bottom right Node 3: bottom left

# (clockwise ordering)

Element 2: top left

Node 1: top right Node 2: bottom left Node 3: top left (clockwise ordering)



#### DSGc3 element 1 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs!

	merre orieur	W CO DICCII	mgc, mapre	50, 5.					
10.42	-6.94	-3.47	-1.74	-3.47	-1.74	-3.47	1.74	-1.74	l
-6.94	17.36	-10.42	6.94	8.68	1.74	-3.47	-1.74	-5.21	
-3.47	-10.42	13.89	-5.21	-5.21	0.00	6.94	-0.00	6.94	
-1.74	6.94	-5.21	3.47	3.47	0.00	-2.60	0.00	-2.60	l
-3.47	8.68	-5.21	3.47	4.34	0.87	-1.74	-0.87	-2.60	
-1.74	1.74	0.00	0.00	0.87	0.87	0.87	-0.87	0.00	
-3.47	-3.47	6.94	-2.60	-1.74	0.87	4.34	-0.87	3.47	
1.74	-1.74	-0.00	0.00	-0.87	-0.87	-0.87	0.87	-0.00	
-1.74	-5.21	6.94	-2.60	-2.60	0.00	3.47	-0.00	3.47	

Printing ele	ement shear	K to Bletzi	.nger Map⊥e	DOFs!					
10.42	-3.47	-6.94	0.00	-1.74	-1.74	-5.21	1.74	-3.47	
-3.47	13.89	-10.42	4.34	6.94	2.60	-2.60	-2.60	-5.21	
-6.94	-10.42	17.36	-4.34	-5.21	-0.87	7.81	0.87	8.68	
0.00	4.34	-4.34	1.74	2.17	0.43	-1.74	-0.43	-2.17	
-1.74	6.94	-5.21	2.17	3.47	1.30	-1.30	-1.30	-2.60	
-1.74	2.60	-0.87	0.43	1.30	0.87	0.43	-0.87	-0.43	
-5.21	-2.60	7.81	-1.74	-1.30	0.43	4.34	-0.43	3.91	
1.74	-2.60	0.87	-0.43	-1.30	-0.87	-0.43	0.87	0.43	
-3.47	-5.21	8.68	-2.17	-2.60	-0.43	3.91	0.43	4.34	

Element 1: bottom right

Node 1: top right

Node 2: bottom left Node 3: bottom right

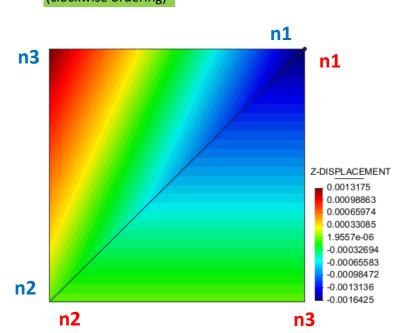
(anticlockwise ordering)

Element 2: top left

Node 1: top right
Node 2: bottom left
Node 3: top left
(clockwise ordering)

# changed so e1 n2 is at top right and nodal ordering reversed on 1 element

symmetry created about diagonal



#### DSGc3 element 1 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs!

•	. Tillering car	inchie oncai	K CO DICCI	mgcmprc	50, 5.					
	10.42	-3.47	-6.94	0.00	-1.74	-1.74	-5.21	1.74	-3.47	
	-3.47	13.89	-10.42	4.34	6.94	2.60	-2.60	-2.60	-5.21	
	-6.94	-10.42	17.36	-4.34	-5.21	-0.87	7.81	0.87	8.68	
	0.00	4.34	-4.34	1.74	2.17	0.43	-1.74	-0.43	-2.17	
	-1.74	6.94	-5.21	2.17	3.47	1.30	-1.30	-1.30	-2.60	
	-1.74	2.60	-0.87	0.43	1.30	0.87	0.43	-0.87	-0.43	
	-5.21	-2.60	7.81	-1.74	-1.30	0.43	4.34	-0.43	3.91	
	1.74	-2.60	0.87	-0.43	-1.30	-0.87	-0.43	0.87	0.43	
	-3.47	-5.21	8.68	-2.17	-2.60	-0.43	3.91	0.43	4.34	

## DSGc3 element 2 shear stiffness matrix

Printing element shear K to Bletzinger Maple DOFs!

•				8p						
	10.42	-3.47	-6.94	0.00	-1.74	-1.74	-5.21	1.74	-3.47	
	-3.47	13.89	-10.42	4.34	6.94	2.60	-2.60	-2.60	-5.21	
	-6.94	-10.42	17.36	-4.34	-5.21	-0.87	7.81	0.87	8.68	
	0.00	4.34	-4.34	1.74	2.17	0.43	-1.74	-0.43	-2.17	
	-1.74	6.94	-5.21	2.17	3.47	1.30	-1.30	-1.30	-2.60	
	-1.74	2.60	-0.87	0.43	1.30	0.87	0.43	-0.87	-0.43	
	-5.21	-2.60	7.81	-1.74	-1.30	0.43	4.34	-0.43	3.91	
	1.74	-2.60	0.87	-0.43	-1.30	-0.87	-0.43	0.87	0.43	
	-3.47	-5.21	8.68	-2.17	-2.60	-0.43	3.91	0.43	4.34	