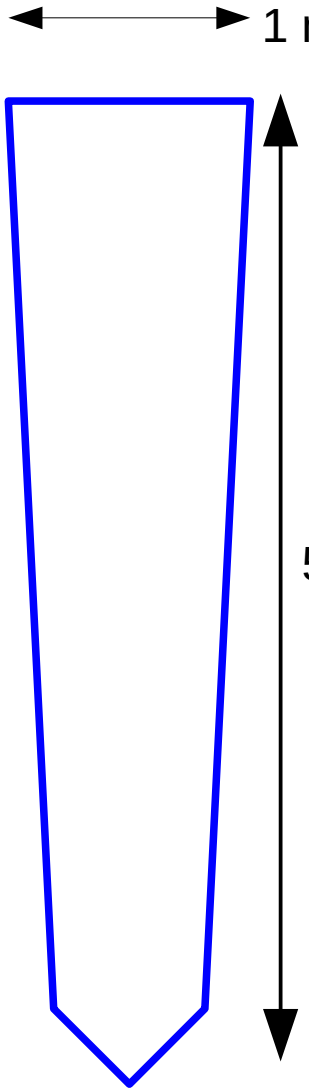
Lautsch Finite Elemente GmbH

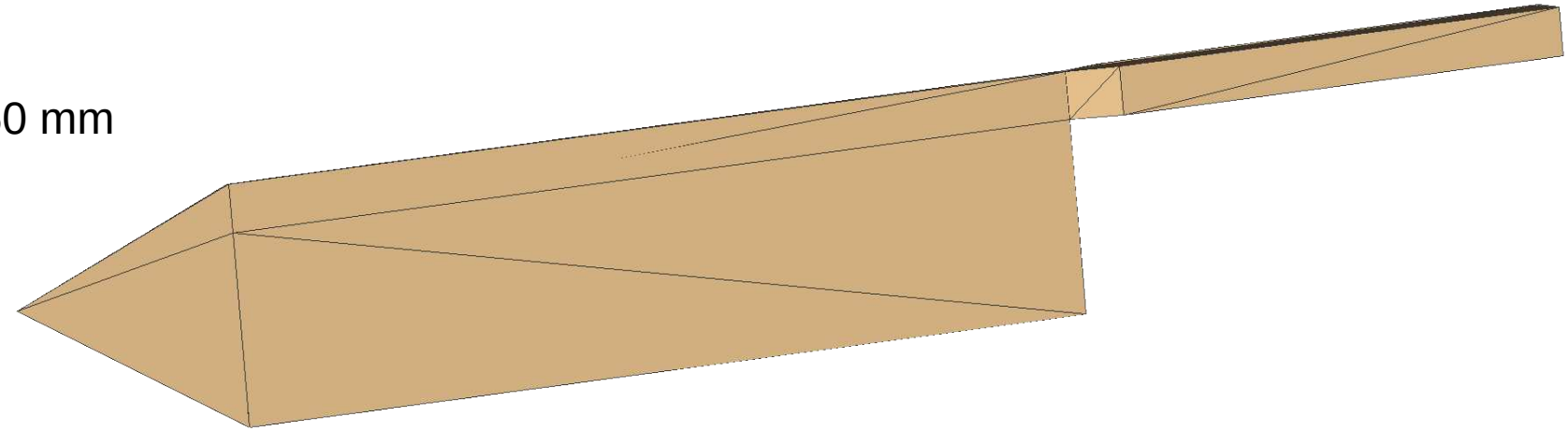
Knife MMT 8.5, 2.7.2023

Blade geometry



Stl file

44	triangles
10 x 10 x 100	handle
1 x 50 x 240	blade



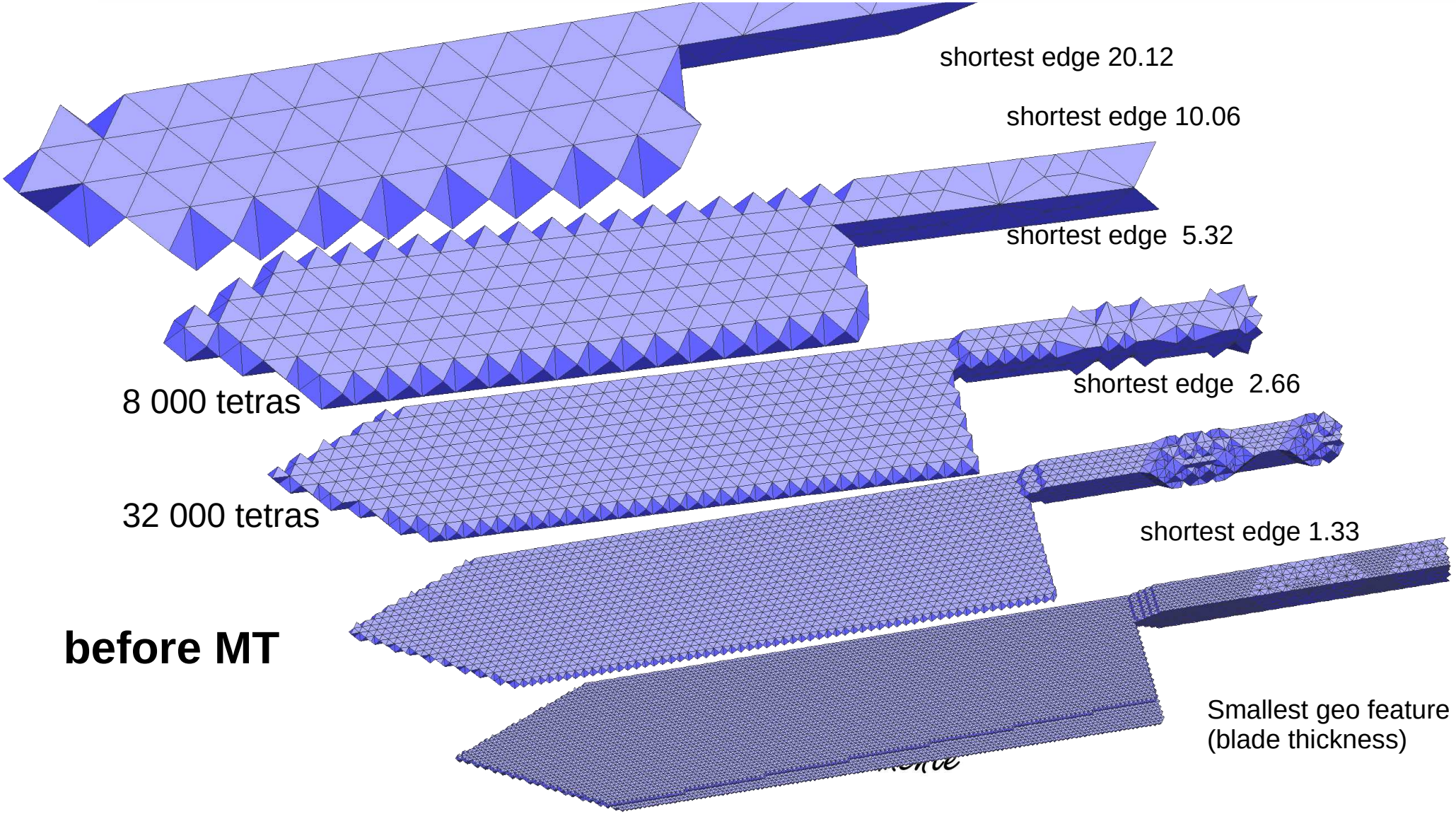
MMT refinement = full refinement, i.e. every solid edge is bisected
every tetra is selfsimilarly split to 8 tetras

Thesis: Approximation power = mesh quality before MMT refinement

Adaptivity = selected refinement according to geometric / FE-computation requirements

RESOLUTION	64	32	16	8	4
octree refinements	5	6	7	8	9
solid tetras	1 994	8 665	32 394	132 511	270 666

Quality before 0.15 worst tetra, 0.4 < average quality < 0.71
after MT refinement 1.0e-7 worst tetra, 0.07 < average quality > 0.242



before MT

Smallest geo feature 0.1
(blade thickness)

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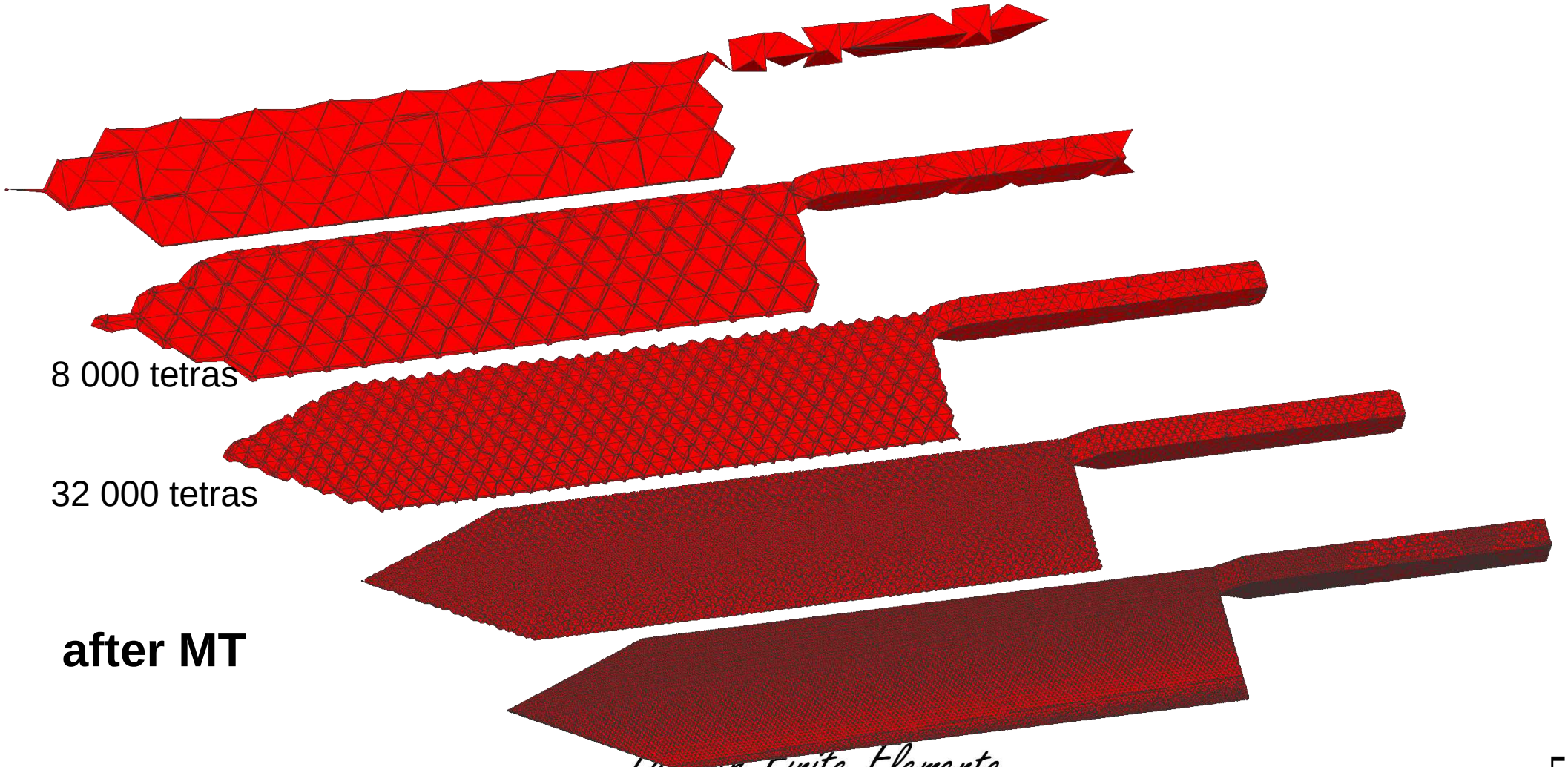


32 000 tetras

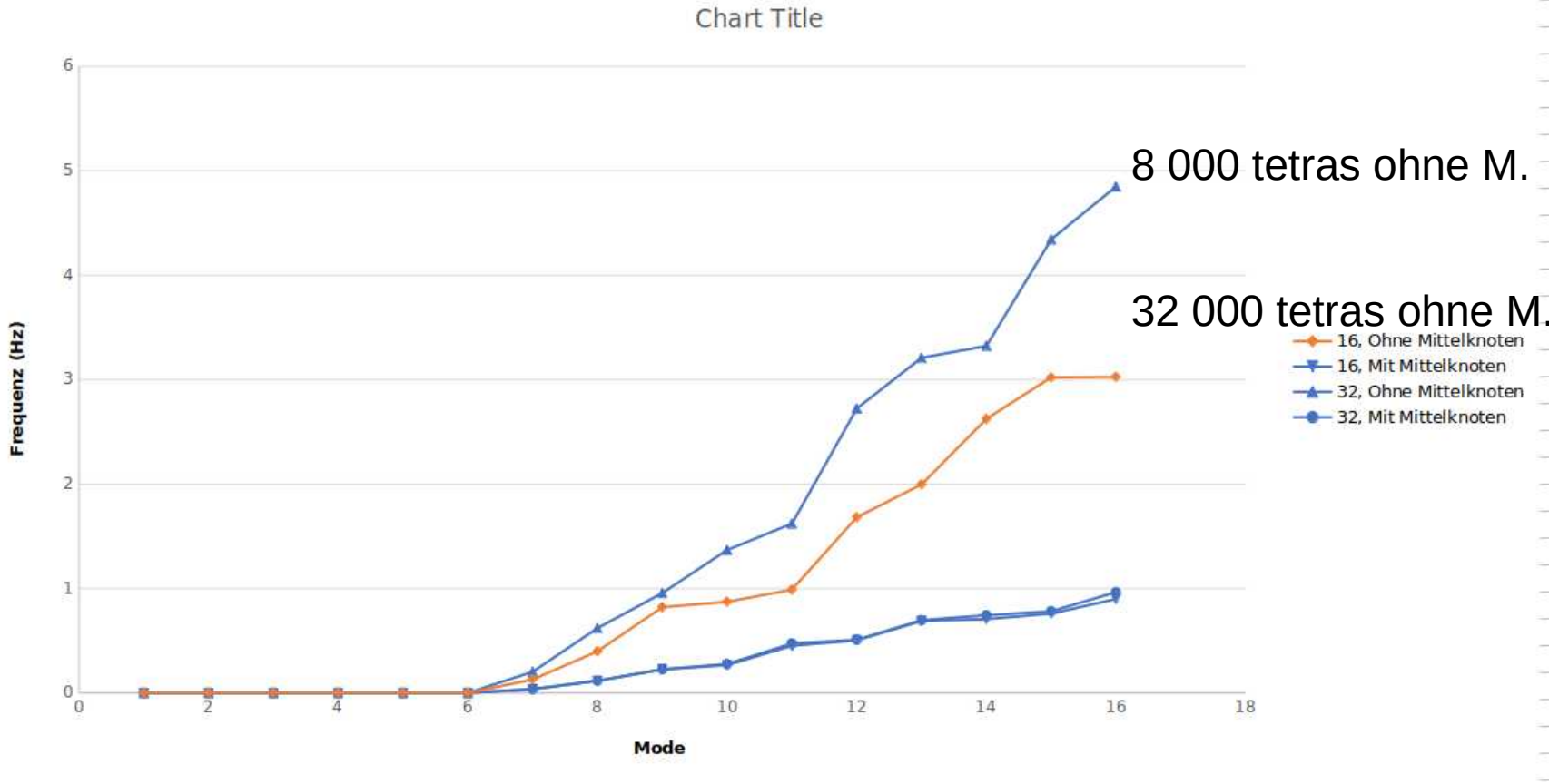
16, Ohne Mittelknoten	
Result set	Time (s)/Frequency (Hz)
1	0
2	0
3	0
4	0
5	0
6	0
7	0,129
8	0,399
9	0,822
10	0,873
11	0,989
12	1,683
13	1,998
14	2,625
15	3,022
16	3,027

16, Mit Mittelknoten	
Result set	Time (s)/Frequency (Hz)
1	0
2	0
3	0
4	0
5	0
6	0
7	0,037
8	0,115
9	0,225
10	0,267
11	0,452
12	0,504
13	0,689
14	0,707
15	0,76
16	0,9

8 000 tetras

32, Ohne Mittelknoten	
Result set	Time (s)/Frequency (Hz)
1	0
2	0
3	0
4	0
5	0
6	0
7	0,203
8	0,621
9	0,957
10	1,37
11	1,622
12	2,724
13	3,21
14	3,323
15	4,344
16	4,85

32, Mit Mittelknoten	
Result set	Time (s)/Frequency (Hz)
1	0
2	0
3	0
4	0
5	0
6	0
7	0,037
8	0,117
9	0,226
10	0,277
11	0,474
12	0,509
13	0,697
14	0,744
15	0,782
16	0,965



8 000 tetras ohne M.

32 000 tetras ohne M.