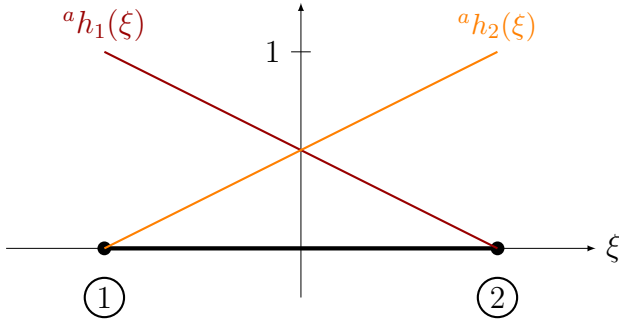


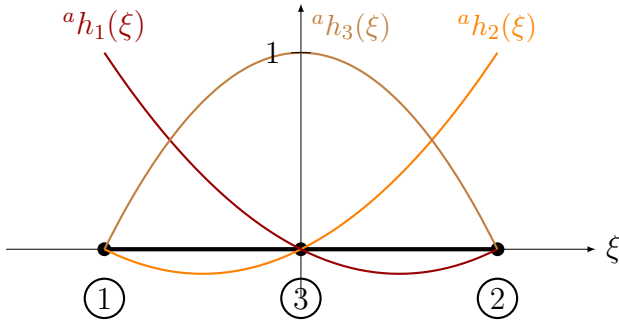
Archetypal elements and shape functions in 1D

Linear



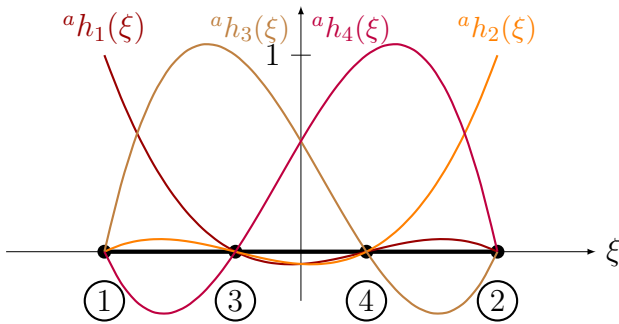
Node	Coordinate	Base function
1	-1	$^a h_1 = (1 - \xi)/2$
2	+1	$^a h_2 = (1 + \xi)/2$

Quadratic



Node	Coordinate	Base function
1	-1	$^a h_1 = \xi(\xi - 1)/2$
2	+1	$^a h_2 = \xi(\xi + 1)/2$
3	0	$^a h_3 = 1 - \xi^2$

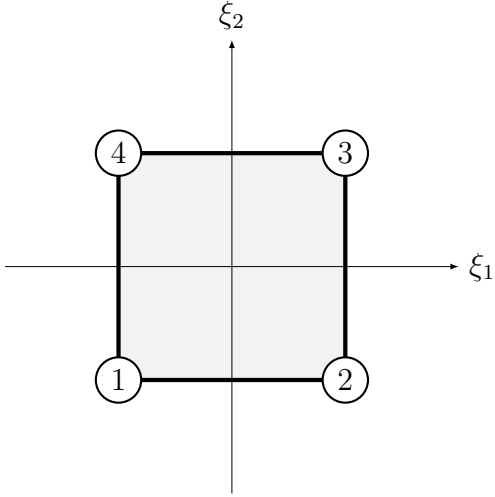
Cubic



Node	Coordinate	Base function
1	-1	$^a h_1 = -(1 - \xi)(1 - 9\xi^2)/16$
2	+1	$^a h_2 = -(1 + \xi)(1 - 9\xi^2)/16$
3	-1/3	$^a h_3 = 9(1 - 3\xi)(1 - \xi^2)/16$
4	1/3	$^a h_4 = 9(1 + 3\xi)(1 - \xi^2)/16$

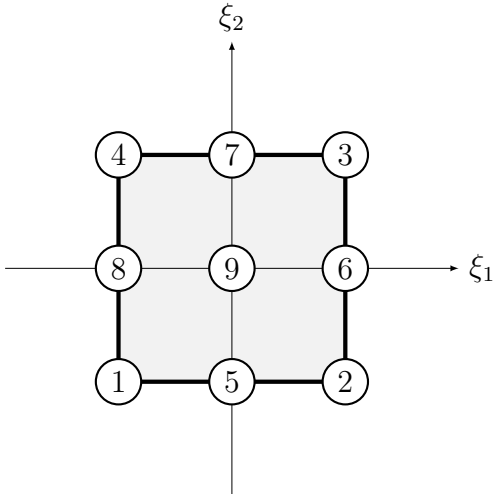
Archetypal elements and shape functions in 2D

Bilinear quadrilateral



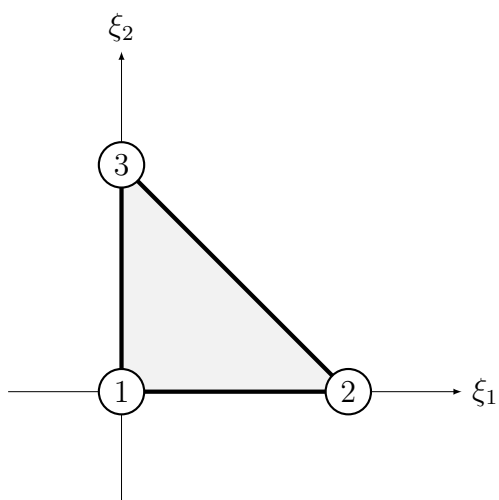
Node	Coordinates	Base function
1	$(-1, -1)$	$^a h_1 = (1 - \xi_1)(1 - \xi_2)/4$
2	$(+1, -1)$	$^a h_2 = (1 + \xi_1)(1 - \xi_2)/4$
3	$(+1, +1)$	$^a h_3 = (1 + \xi_1)(1 + \xi_2)/4$
4	$(-1, +1)$	$^a h_4 = (1 - \xi_1)(1 + \xi_2)/4$

Biquadratic quadrilateral



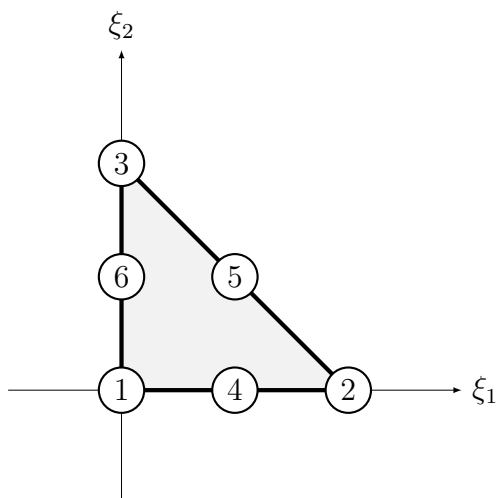
Node	Coordinates	Base function
1	$(-1, -1)$	$^a h_1 = \xi_1 \xi_2 (\xi_1 - 1)(\xi_2 - 1)/4$
2	$(1, -1)$	$^a h_2 = \xi_1 \xi_2 (\xi_1 + 1)(\xi_2 - 1)/4$
3	$(1, 1)$	$^a h_3 = \xi_1 \xi_2 (\xi_1 + 1)(\xi_2 + 1)/4$
4	$(-1, 1)$	$^a h_4 = \xi_1 \xi_2 (\xi_1 - 1)(\xi_2 + 1)/4$
5	$(0, -1)$	$^a h_5 = \xi_2 (1 - \xi_1^2)(\xi_2 - 1)/2$
6	$(1, 0)$	$^a h_6 = \xi_1 (\xi_1 + 1)(1 - \xi_2^2)/2$
7	$(0, 1)$	$^a h_7 = \xi_2 (1 - \xi_1^2)(\xi_2 + 1)/2$
8	$(-1, 0)$	$^a h_8 = \xi_1 (\xi_1 - 1)(1 - \xi_2^2)/2$
9	$(0, 0)$	$^a h_9 = (1 - \xi_1^2)(1 - \xi_2^2)/2$

Bilinear triangular



Node	Coordinates	Base function
1	$(0, 0)$	${}^a h_1 = 1 - \xi_1 - \xi_2$
2	$(1, 0)$	${}^a h_2 = \xi_1$
3	$(0, 1)$	${}^a h_3 = \xi_2$

Biquadratic triangular



Node	Coordinates	Base function
1	$(0, 0)$	${}^a h_1 = (1 - \xi_1 - \xi_2)(1 - 2\xi_1 - 2\xi_2)$
2	$(1, 0)$	${}^a h_2 = \xi_1(2\xi_1 - 1)$
3	$(0, 1)$	${}^a h_3 = \xi_2(2\xi_2 - 1)$
4	$(1/2, 0)$	${}^a h_4 = 4\xi_1(1 - \xi_1 - \xi_2)$
5	$(1/2, 1/2)$	${}^a h_5 = 4\xi_1\xi_2$
6	$(0, 1/2)$	${}^a h_6 = 4\xi_2(1 - \xi_1 - \xi_2)$