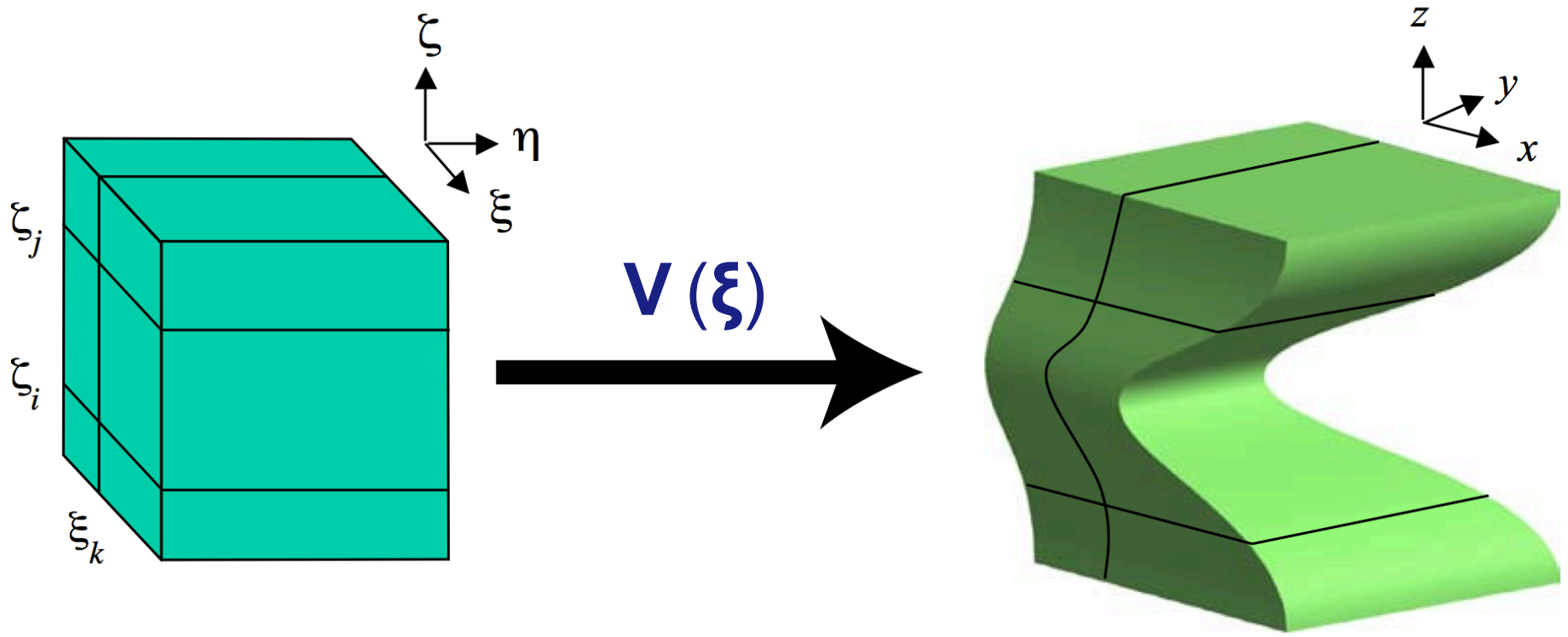
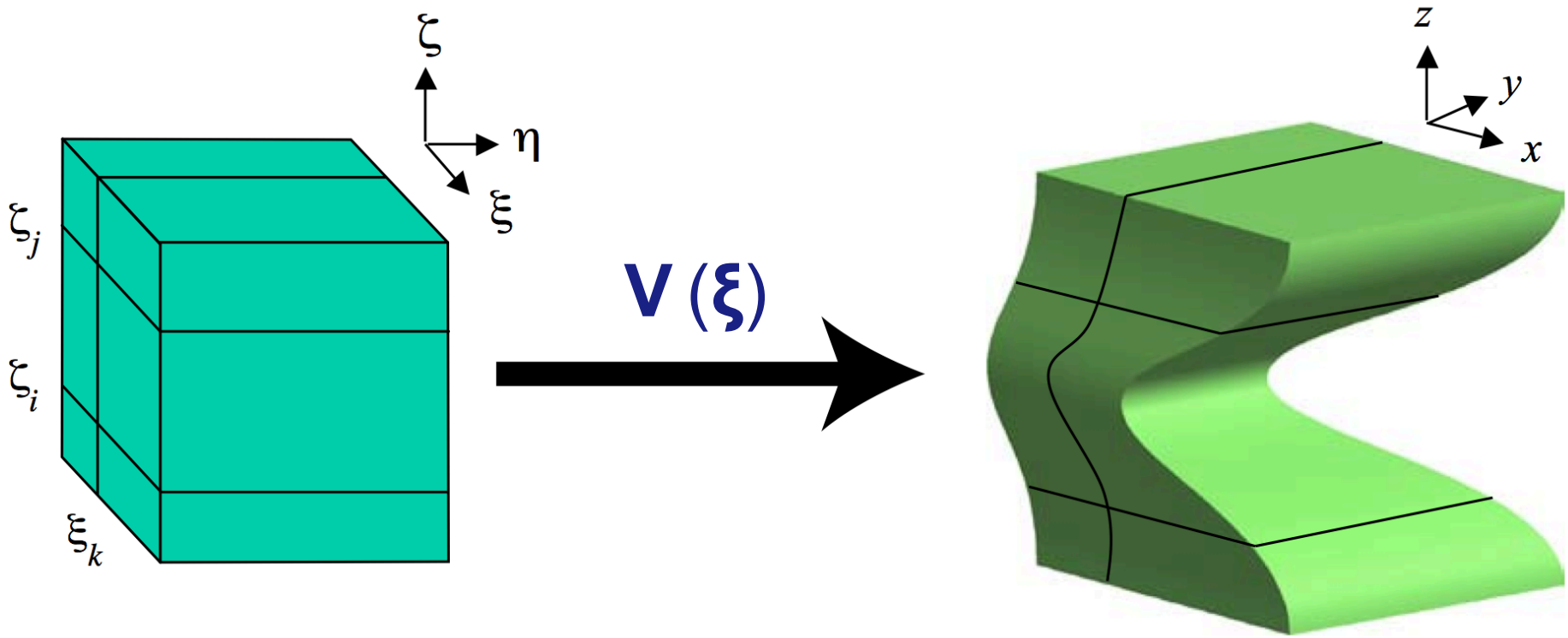
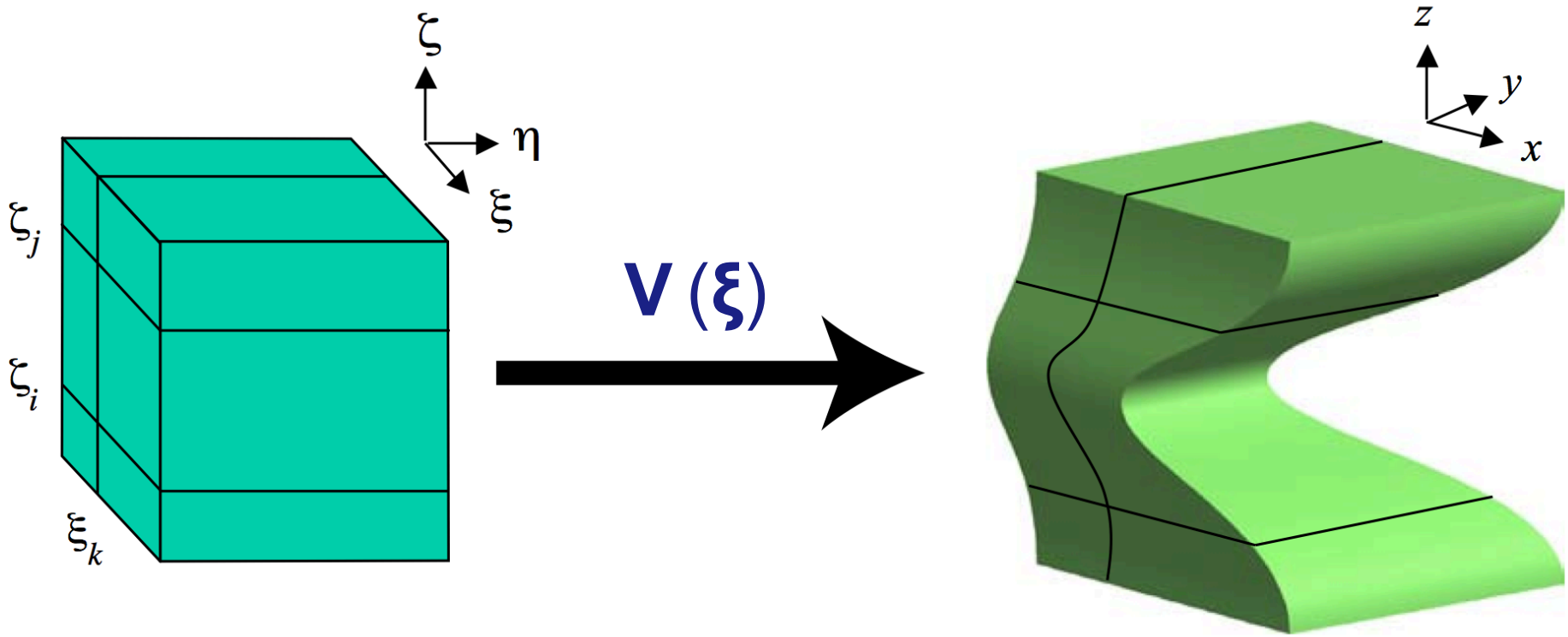
Multi-Patch Geometries

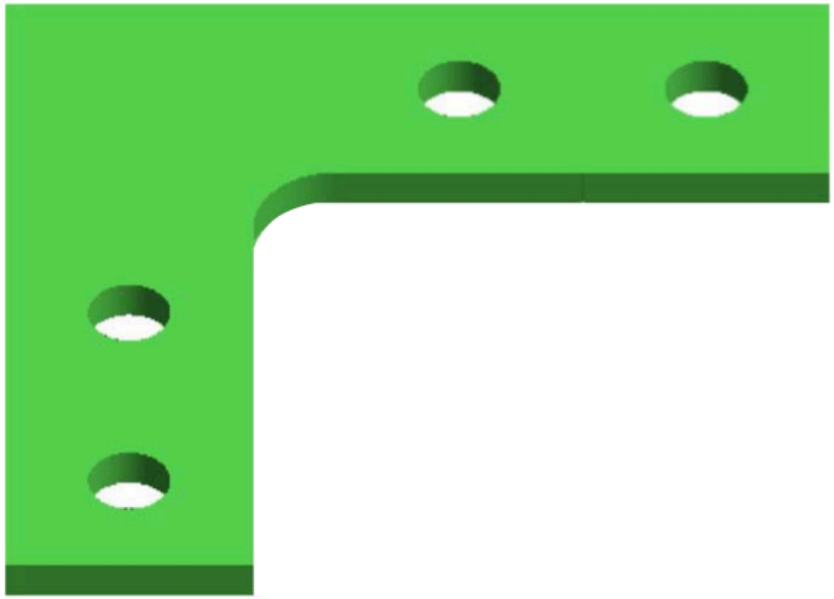

ζ
η
ξ
ζ_j
ζ_i
ξ_k
V (ξ)
z
y
x



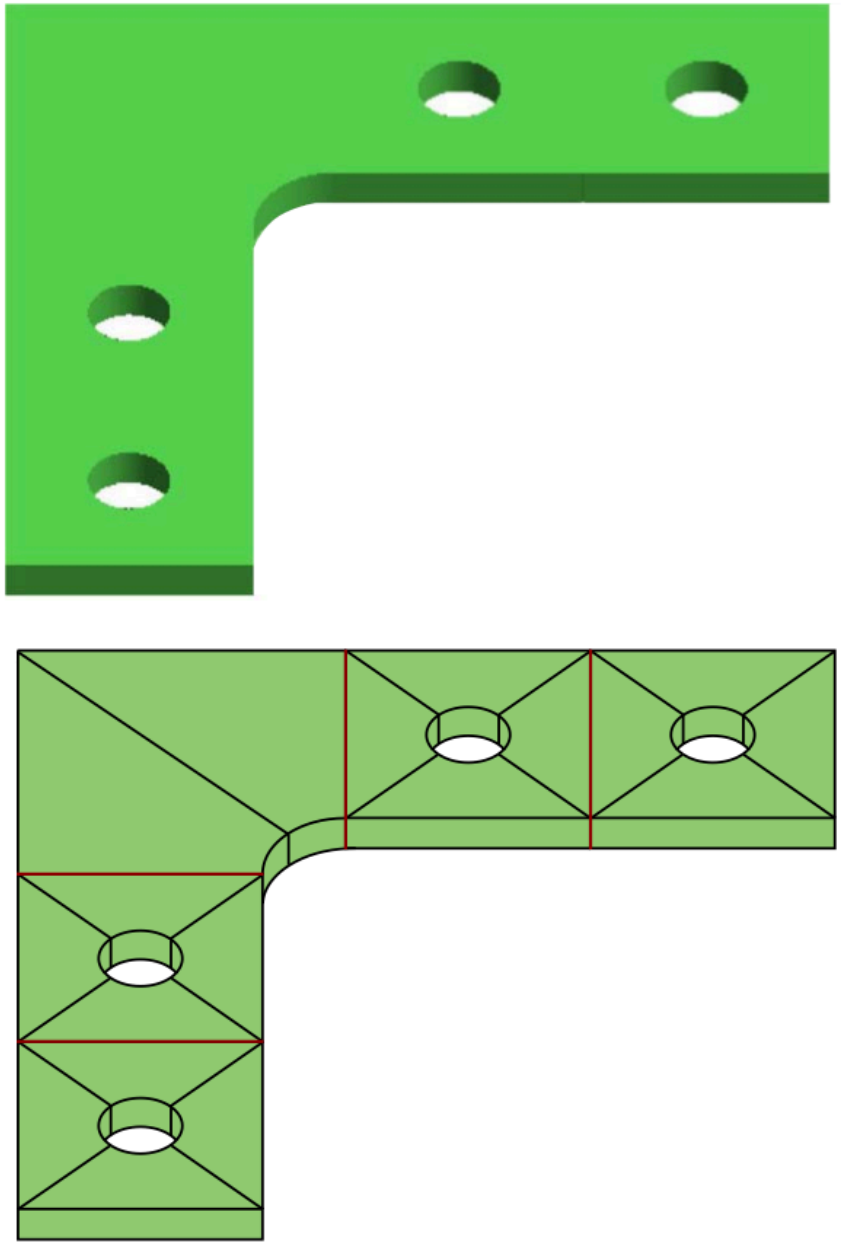
This is referred to as a ***single patch*** geometry, as the geometry is composed using a single NURBS map.

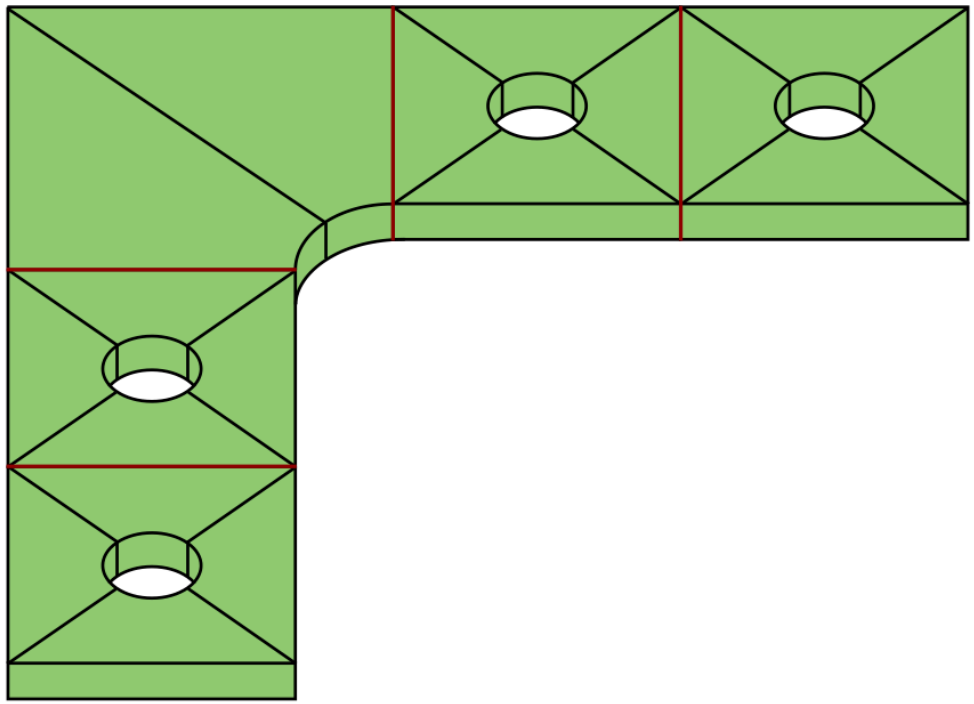


The single NURBS map takes the patch from ***parametric space*** to ***physical space***.

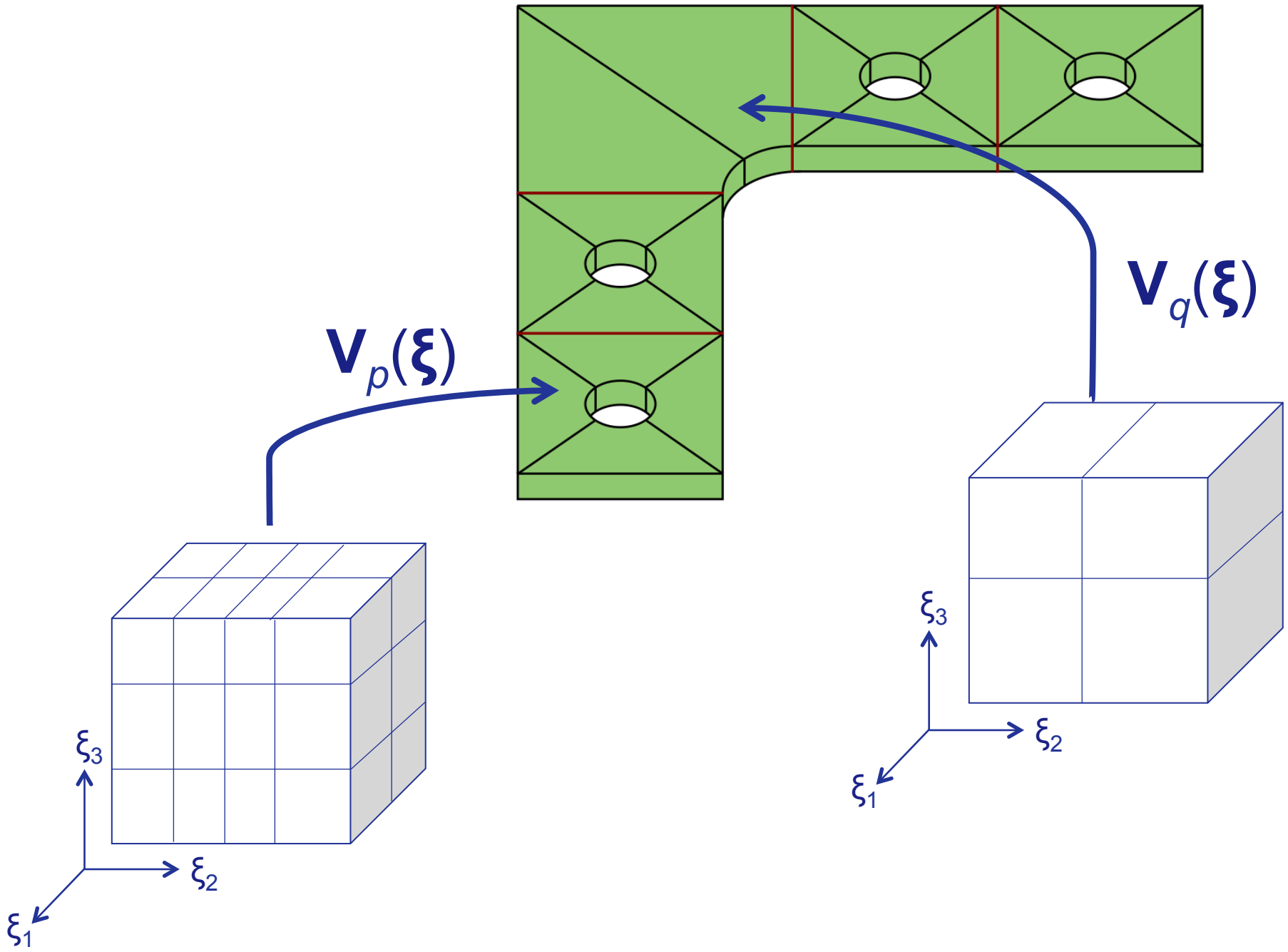


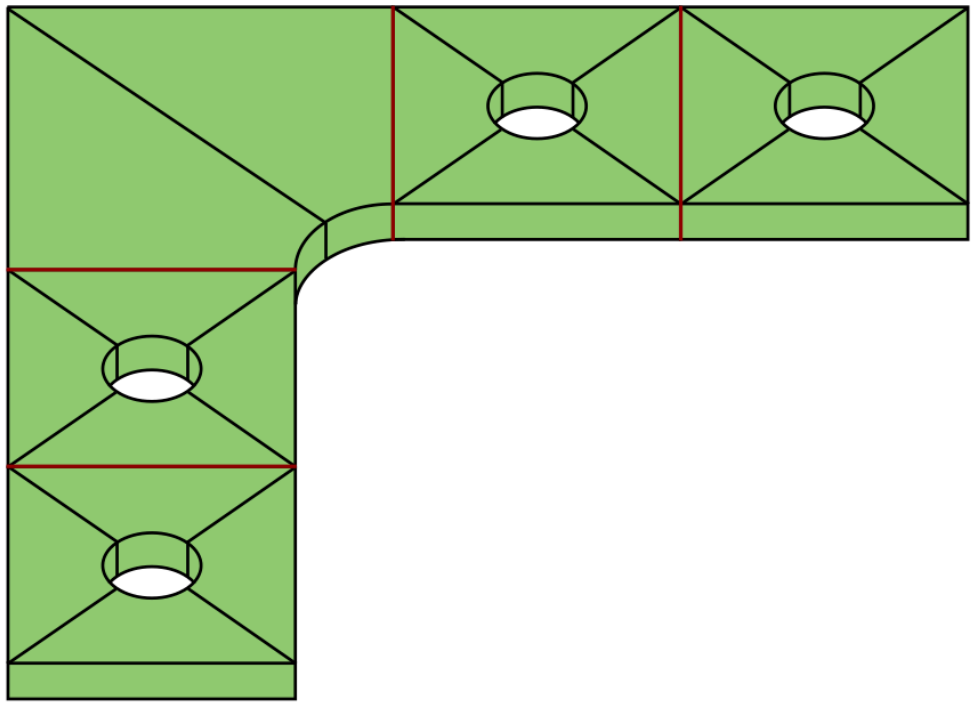
For this configuration, it is impossible to use a single NURBS map to parameterize the geometry. Instead, we use ***multiple patches***.



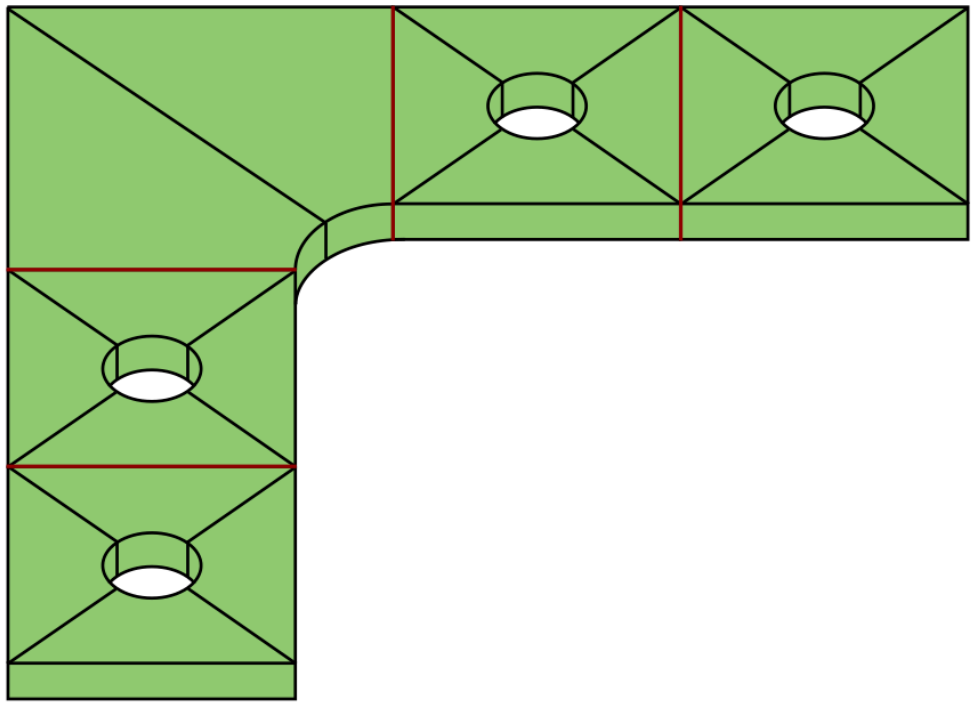


For ***each patch*** in ***physical space***, there is a ***corresponding p***
in ***parametric space***. A single NURBS mapping then takes the
patch back and forth from parametric space to physical space.


$\mathbf{V}_p(\boldsymbol{\xi})$
$\mathbf{V}_q(\boldsymbol{\xi})$
ξ_3
ξ_2
ξ_1
ξ_3
ξ_2
ξ_1



To ensure a ***watertight*** geometry, we must ensure that the patche
meet ***parametrically*** and ***geometrically*** on the internal faces whe
they meet.



To ensure a ***watertight*** geometry, we must ensure that the patche
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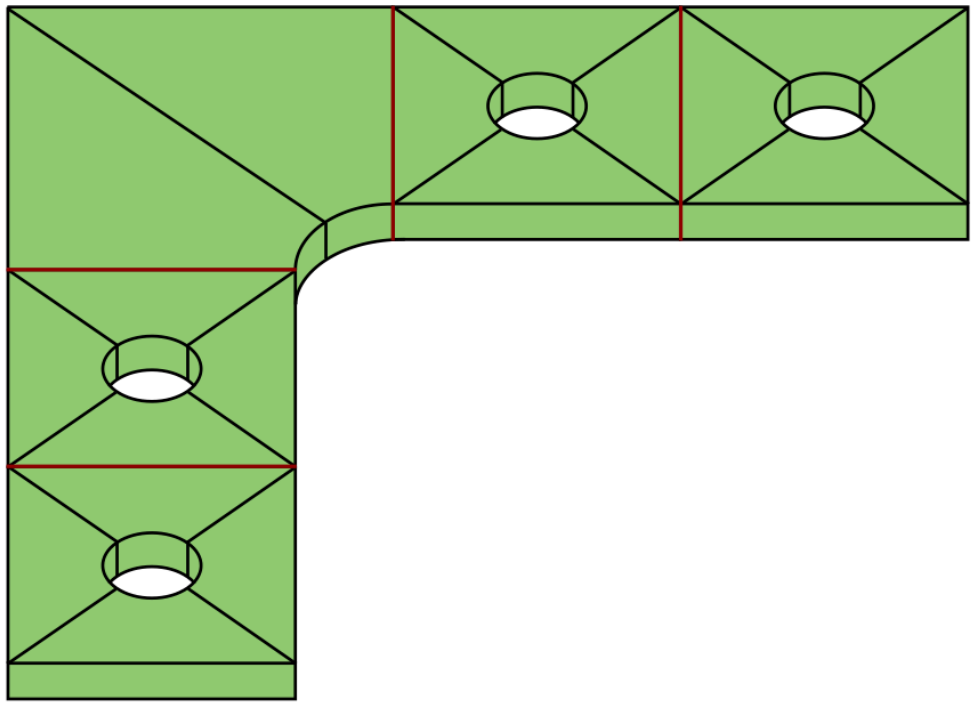
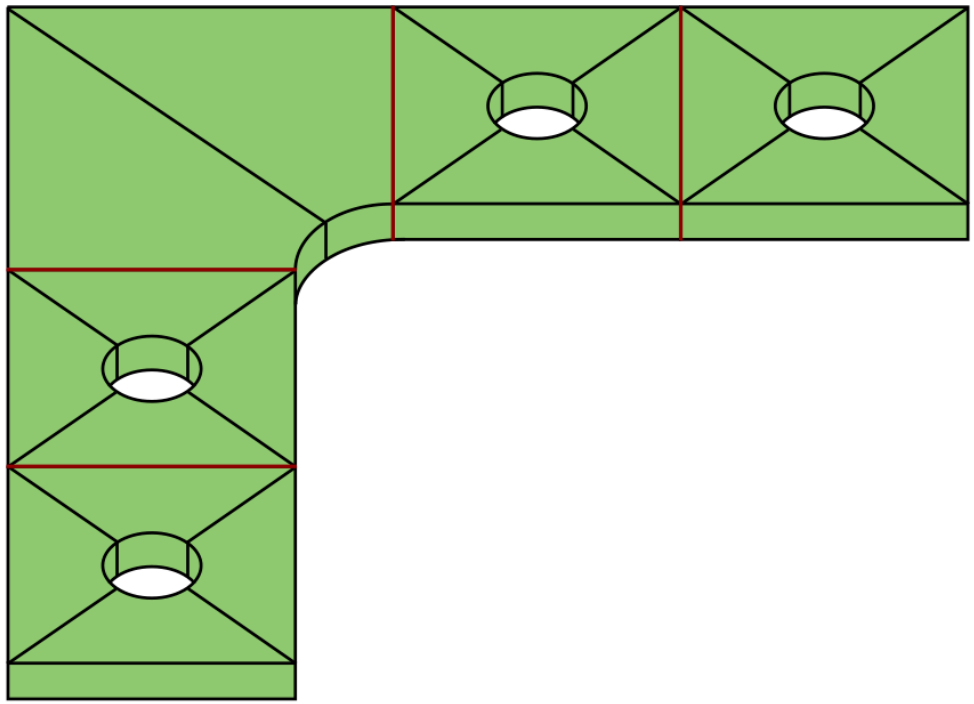
This requires that the ***control nets*** on opposing faces are coincid



All of the aforementioned machinery may be extended to the mult patch setting. In fact, the element extraction operators are ***unchanged***.

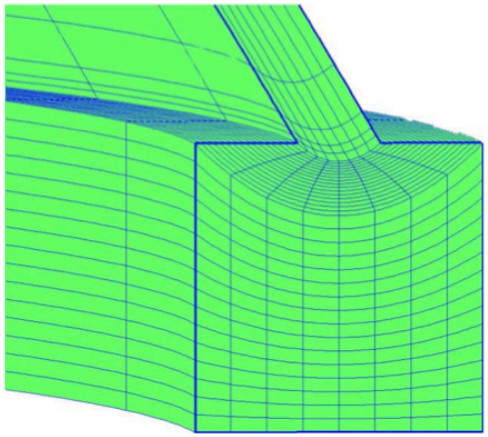


All of the aforementioned machinery may be extended to the mult patch setting. In fact, the element extraction operators are ***unchanged***.

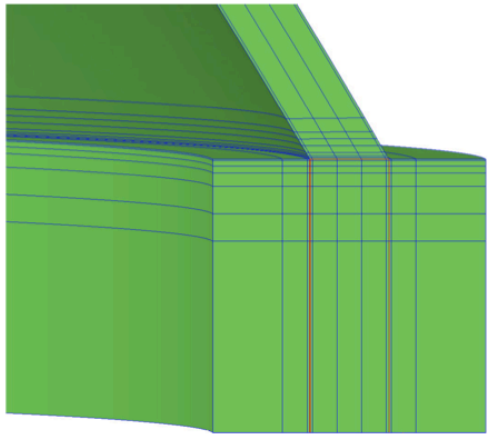
The patch-wise IEN arrays are modified using a ***master-slave*** relationship at the patch interfaces. See notes for more details.

Single Patch Geometry

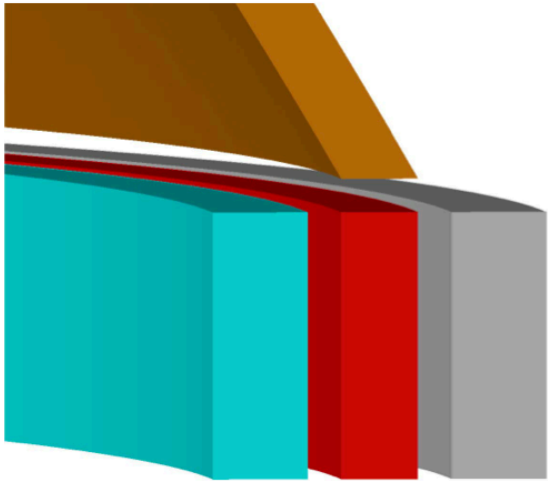
(a)



(b)



(c)



(d)

Multi-Patch Geometry