

# Multi-Label Simple Points Definition for 3D Images Digital Deformable Model

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## Goal in Image Processing

Deformation w/o topological modification of the partition

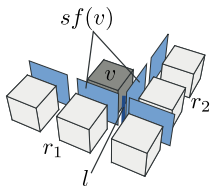
## Our Solution

- use intervoxel elements to represent boundaries;
- definition of multi-label simple points (ML-Simple points):
  - allow geometrical modification of faces;
  - forbid geometrical modification around edges and vertices;
- deformation algorithm based on ML-Simple points.

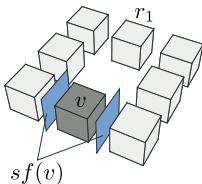
# ML-Simple Points

A voxel  $v$  is ML-Simple if:

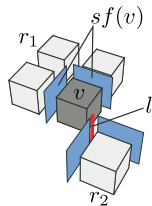
- 1  $\forall l \in \text{linels}(v), \text{degree}(l) \in \{0, 2\}$ ;
- 2 the body of  $sf(v)$  is homeomorphic to a 2-disk;
- 3  $\forall l \in \text{linels}(v), \text{degree}(l, v) = 0 \Rightarrow \text{degree}(l) = 0$ .



1

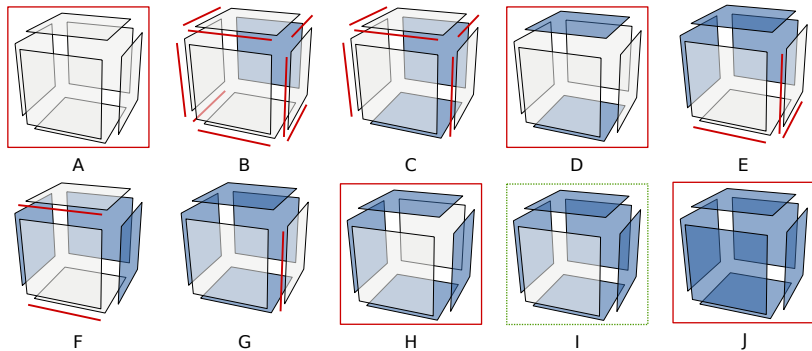


2



3

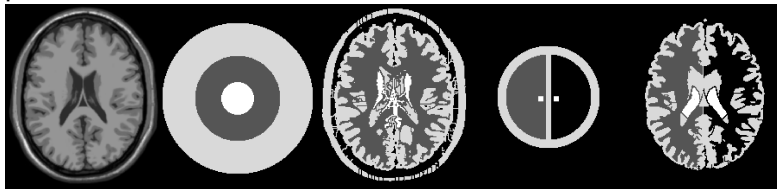
# 3D Cases



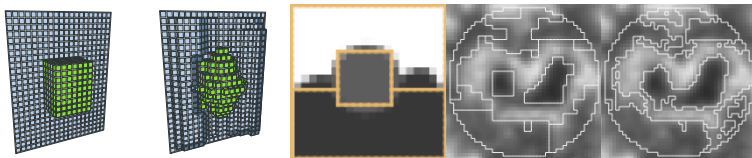
All configurations can be obtained by rotations and symmetries.  
⇒ simple local detection algorithm.

# Deformation of the partition of an image

partition without surface intersections:



partition with surface intersections:



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