

Image transformations

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Relationship between point and image transformations

Define:

- ▶ The *forward* transformation maps *points* from moving to target space.
- ▶ The *inverse* transformation maps *points* from target to moving space.

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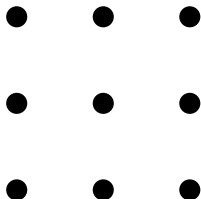
Then:

- ▶ We need the *inverse* transformation to map *images* from moving to target space
- ▶ We need the *forward* transformation to map *images* from target to moving space

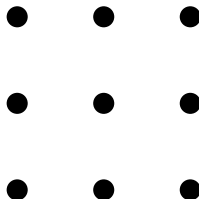
The following will explain why this is the case.

Transforms on a grid

Moving image grid

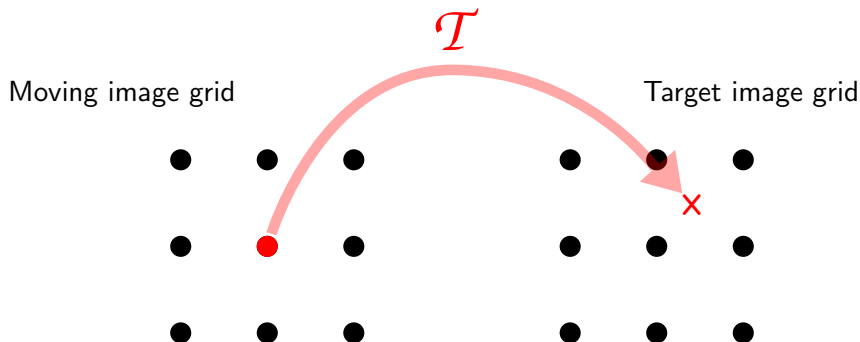


Target image grid



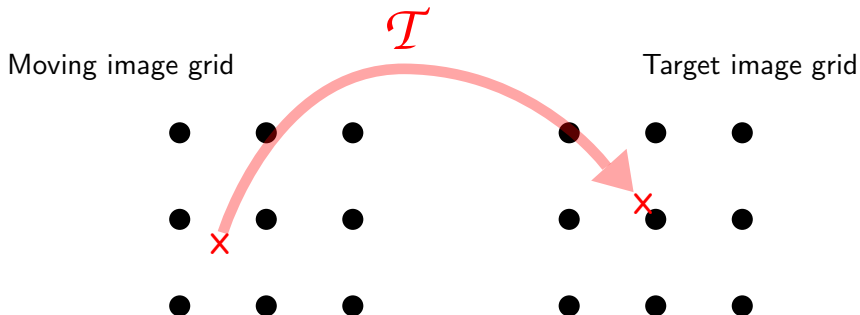
We have a moving image that we want to transform, and render on a new, target image grid.

Transforms on a grid



A transformation maps points from the moving space to the target space. But moving grid points may not land on the target grid.

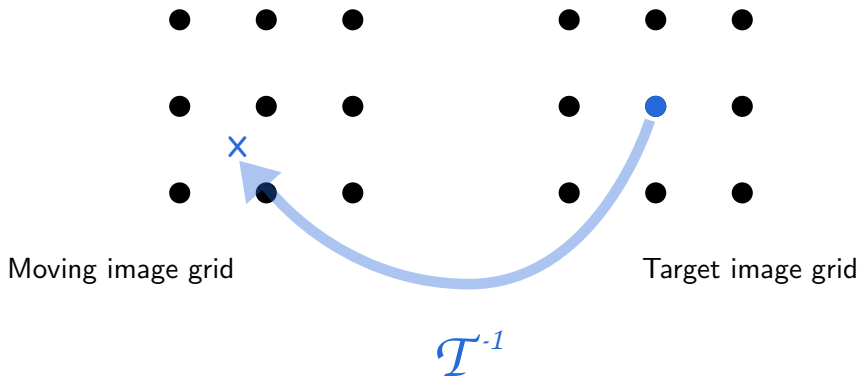
Transforms on a grid



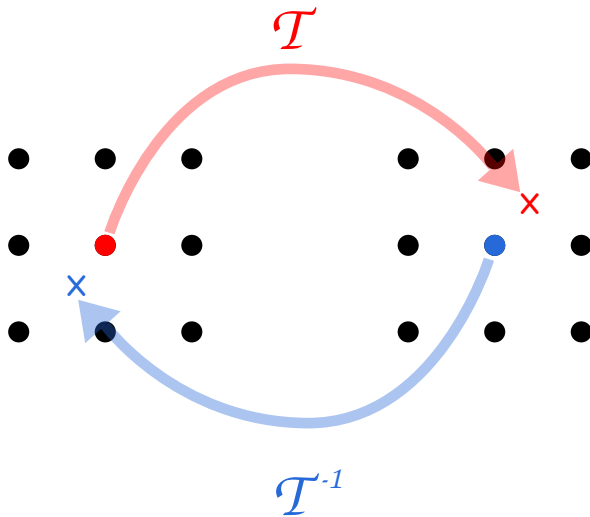
How do we find a point in moving space (possibly between grid points) that maps to a grid point?

Transforms on a grid

Applying the inverse of the transformation to grid points in target space tells us where to sample from in moving space.



Transforms on a grid



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Then:

- ▶ We need the *inverse* transformation to map *images* from moving to target space
- ▶ We need the *forward* transformation to map *images* from target to moving space