Notes of Mango CT package

1. Coordinate system:



The coordinate system used in the code is shown in the above figure. The positive direction of the rotation is counterclockwise. The positive direction of the u-axis is by rotating the vector connecting the origin and the source 90 degrees clockwise.

1. The indices of x,y,z axis in the reconstructed image all begins with zero (as a C convention). The relationship between the index of x axis () and the real position is defined as

Where is the number of total number of pixels in x direction and is the shift of the center of the image; The relationship between the index of y axis () and the real position is defined as

This is because the tow row indicates a larger while the bottom row indicates a smaller . The relationship between the index of z axis () and the real position is defined as

So the first slice has a smaller , which is in the bottom of the image while the last slice has a larger .

1. The indices of the detector row () and column () all begins with zero (as a C convention). The relationship between the index of u axis () and the real position is defined as

Where is the number of total number of pixels in direction and offcenter of the detector in direction. The relationship between the index of v axis () and the real position is defined as

Where is the number of total number of pixels in direction and offcenter of the detector in direction.

1. If p matrix is applied, the u and v are solely determined by the pmatrix instead of the beta. Beta is used to calculate the integral interval and . The pmatrix has to be consistent with the angles other wise the weight will have some problems.