Exercise class – Ex3

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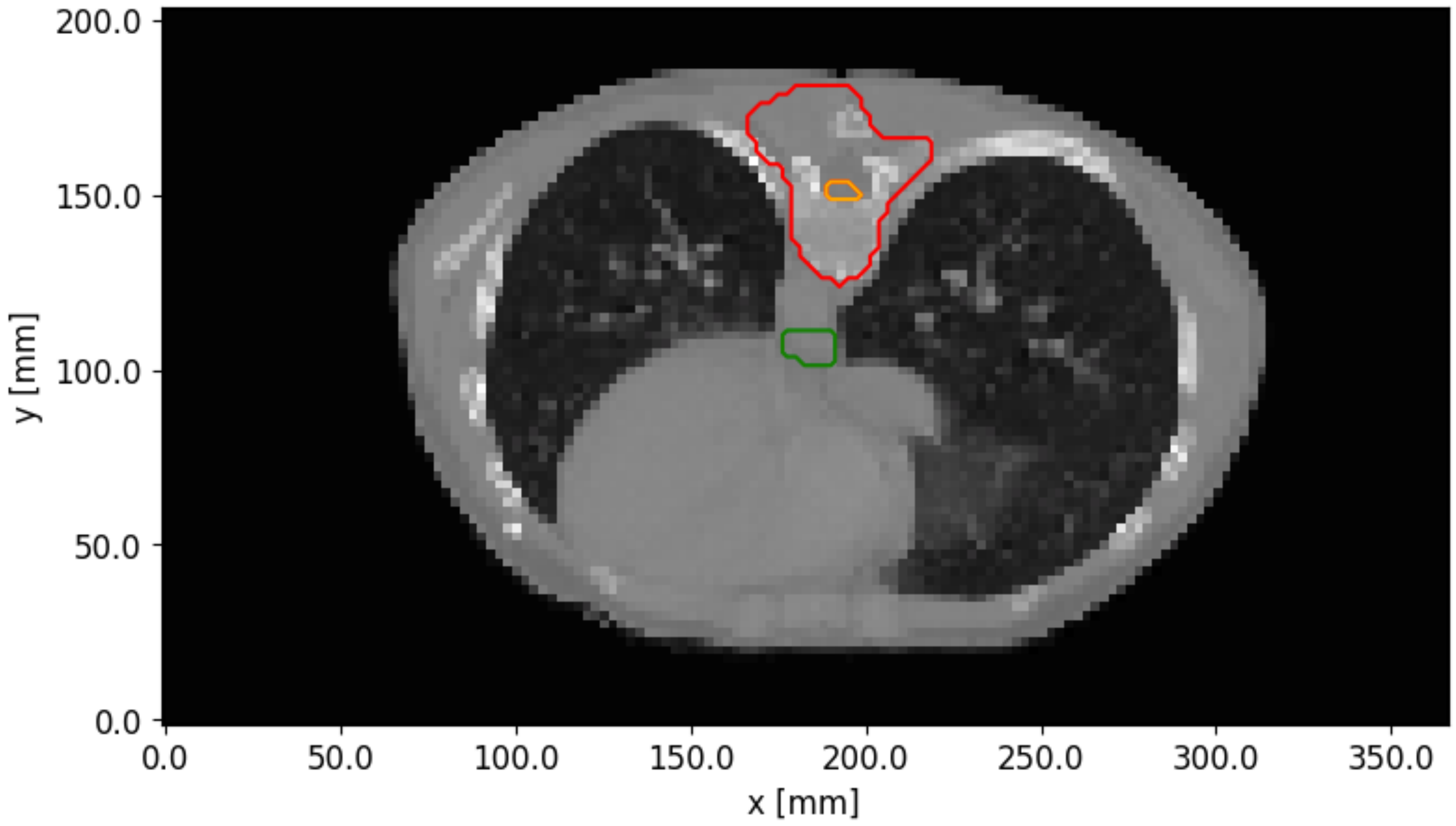
Exercise 1

Plot CT with VOIs → well solved!



Student solution for ex. 1

Exercise 2

Implement a function to visualise a dose distribution together with the CT and the VOIs!

→ The dose distribution is stored in *exampledose.mat*

→ Show the CT in greyscale and the dose distribution in colour (e.g. *jet* colourmap)

→ Show the VOIs from ex.1

→ Make the dose distribution partially transparent by setting the `alpha` parameter

Any questions regarding ex.2?

Exercise 3

Goal of the next two weeks: Implement a pencil beam algorithm!

1. Ray-tracing algorithm which calculates the **radiological depth** of all voxels → **this week**
2. A model of the **dose distribution in water** → **next week**

Radiological depth: $$z^{rad}(z) = \int_0^z \frac{\mu_m(z')}{\mu_w} dz'$$

z: geometrical depth from patient surface

$$\frac{\mu_m(z')}{\mu_w} = \begin{cases} \frac{H+1000}{1000} & (-1000 < H < 0) \\ 1 + \frac{1}{2}\frac{H}{1000} & (H \geq 0) \end{cases}$$

H: Hounsfield units at z’

Exercise 3

Write a function `calculate_raddepth(angle)` which calculates the radiological depth for each voxel.

Input

– angle: incident angle of the beam

Return

– 2D array with the radiological depth for each voxel

What we expect!