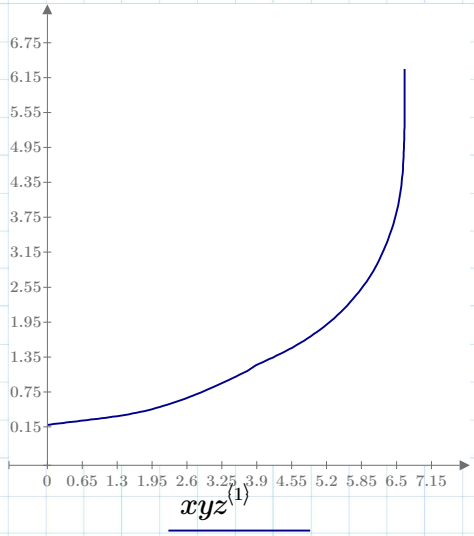
Read in the station line of the vessel. xyz<0>is longitudinal, xyz<1> is lateral, xyz<2> is vertical.

$xyz := \mathrm{READPRN}(\text{".\XYZ.prn"})$ Plot the section



$xyz^{\langle 2 \rangle}$

Calculate for the station the area (x2 as only one half defined) for waterline depth of 3.8

$$\int_{(xyz^{\langle 2 \rangle})_0}^{3.8} \mathrm{linterp}\left(xyz^{\langle 2 \rangle}, xyz^{\langle 1 \rangle}, y\right) \mathrm{d}y \cdot 2 = 34.36$$ Area to waterline

Calculate the vertical cg at this station above the keel line at zero.

$$\frac{\int_{(xyz^{\langle 2 \rangle})_0}^{3.8} \mathrm{linterp}\left(xyz^{\langle 2 \rangle}, xyz^{\langle 1 \rangle}, y\right) \cdot y \, \mathrm{d}y}{\int_{(xyz^{\langle 2 \rangle})_0}^{3.8} \mathrm{linterp}\left(xyz^{\langle 2 \rangle}, xyz^{\langle 1 \rangle}, y\right) \mathrm{d}y} + \left(xyz^{\langle 2 \rangle}\right)_0 = 2.51$$ Centroid above Keel

Use linear interpolation at each station to allow for changes of direction at chines.
Use spline interpolation along the vessel to be smooth. Create the spline then interperet it in the intergration just like the linterp above.