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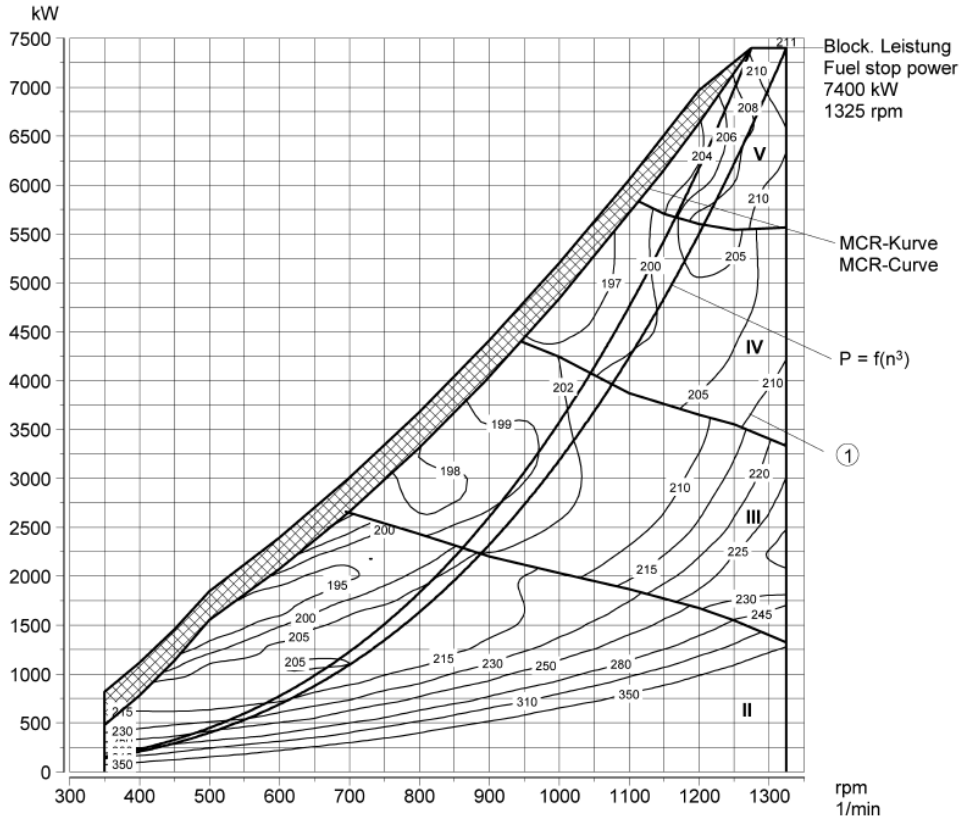
Problem for MiMM 2025, Kongsberg Maritime Sweden AB

Using math for image recognition

In the design of marine propellers, much effort is put into optimizing the design to minimize fuel consumption. In this process, the engine fuel consumption is critical. However, engine fuel consumption is complex and described by engine manufacturers in an engine performance diagram, so-called mussel diagram, see example below. It is a contour plot.

To include engine fuel consumption in a detailed manner in optimization by software, the mussel diagrams need to be converted into numbers. This conversion can be made manually, reading of point by point in the diagram but that is a time-consuming task.



An example of an engine performance diagram, so-called mussel diagram.

If an algorithm should do the conversion, it must be able to recognize text and curves and be able to associate curves with text, for example the scale of the axes and the value of a contour level curve. A curve can be intersected by another curve or line, like the background grid.

Can the diagram be converted into numbers by an algorithm?