

Complex functions for Engineering Students

Exercise class 4

Exercise 1:

Let the mapping $T : \mathbb{C}^* \rightarrow \mathbb{C}^*$ with

$$T(z) = \frac{z + 2}{z - 2}$$

be given.

- Does T represent a Möbius transformation?
- Compute the inverse mapping.
- Determine the image of the real axis.
- Determine the image of the circumference $|z| = 2$.
- Determine the image of the imaginary axis.
- Where is the semicircle H mapped to?

$$H := \{z \in \mathbb{C} \mid |z| \leq 2, \operatorname{Im}(z) \geq 0\}$$

Exercise 2:

We are looking for a Möbius transformation $w = T(z)$ with $T(-1) = 1$ and $T(0) = 0$, which maps the left half-space $\operatorname{Re}(z) \leq 0$ onto the circular disc $|w - 1| \leq R$. How large is R ?

Dates of classes: 22.5. - 26.5.