

## HOMEWORK 6

### 1. ADDITIONAL PROBLEMS FOR HOMEWORK SET 6.

- A.1.** Give an example of a differentiable function (on some open finite interval) but not  $C^1$ , i.e. the first derivative is not continuous.
- A.2.** Recall spaces  $L^1(-\pi, \pi)$  and  $L^2(-\pi, \pi)$ . Give an example of a function which is in  $L^1$  but not in  $L^2$ . Could you do the same with  $L^1(\mathbb{R})$  and  $L^2(\mathbb{R})$  ?
- A.3.** Give an example of a bounded linear operator  $T$  such that
- (a)  $T : L^2 \rightarrow L^2$
  - (b)  $T : L^1 \rightarrow L^\infty$ .

Here, Lebesgue spaces can be defined on a finite interval or on all of  $\mathbb{R}$ .