

**Exercise session 1, Stochastic Calculus Part I.**

- 1** Let  $f(t) = \sin(t)$ . Find the variation of  $f$  over the interval  $[0, 2\pi]$ .
- 2** Show that  $V_{g+h}(t) \leq V_g(t) + V_h(t)$ .
- 3** If  $f(t) = e^{-t}$  and  $g(t) = [t]$  (the integer part of  $t$ ), calculate the Stieltjes integrals  $\int_0^\infty g(t)df(t)$  and  $\int_0^\infty f(t)dg(t)$ .
- 4** Prove Grönwall's lemma.