1. Let $\mu(dt) = dt$, $T = [0, 1]$, and
   \[ f(t_1, t_2, t_3) = t_1 t_2 \sin^2 t_3, \]
   \[ g(t_1, t_2) = t_1 \cos^2 t_2. \]
   Calculate $f \otimes g$ ja $f \otimes_2 g$.

2. Let $f \in \tilde{L}^2(T^p)$ ja $g \in \tilde{L}^2(T^q)$. Show that
   \[ I_p(f)I_q(g) = \sum_{r=0}^{\min(p,q)} r!(\binom{p}{r})(\binom{q}{r})I_{p+q-2r}(f \otimes_r g). \]

3. Show that the Wiener–Itô chaos expansion (2.3.12) is unique when the functions $(f_n)_{n=0}^\infty$ are symmetric.

4. Let $W = (W_t)_{t \in [0, 1]}$ be the Brownian motion. Let $t \in [0, 1]$ and $F = W_t^5$. Find the chaos expansion of the function $F$.

5. Let $W = (W_t)_{t \in [0, 1]}$ be the Brownian motion. Let $h \in L^2([0, 1])$, $t \in [0, 1]$ and
   \[ F = \exp \left\{ \int_0^t h(s) \, dW_s \right\}. \]
   Find the chaos expansion of the function $F$. 