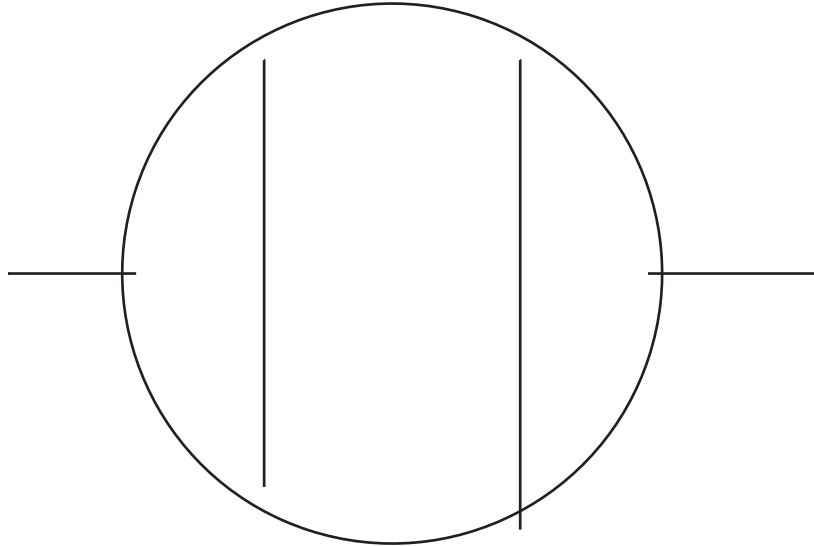# EXERCISE II
(NOV 28 2012, TO BE HANDED IN DEC 19 2012)

INTRODUCTION TO THE RENORMALIZATION GROUP EQUATION (KREIMER, WS 12/13)

Consider the graph $\Gamma =$

- 1.

  Consider the Hopf algebra H_Γ which is generated as an algebra by Γ and its 1PI sub- and co-graphs with $\omega_6 \leq 0$. Find all generators. Using Δ_6, work out the co-products of all generators.

- 2.

  Let $\phi \in G_V^{H_\Gamma}$ as in class, $R : V \to V$ a Rota–Baxter map.

  Determine $S_R^\phi = -R(m_V(S_R^\phi \otimes \phi P)\Delta_6)$ and $S_R^\phi \star \phi = m_V(S_R^\phi \otimes \phi)\Delta_6$ for all sub- and co-graphs.