

Tutorial 10: Width of conjunctive queries

(1) Construct the GHDs of the following queries.

(a) $\varphi_1(x_1, \dots, x_6) := R(x_1, x_2, x_3) \wedge S(x_3, x_4, x_5) \wedge T(x_1, x_6, x_5).$

(b) $\varphi_2(x_1, \dots, x_6) := R(x_1, x_2, x_x) \wedge S(x_3, x_4, x_5) \wedge T(x_1, x_6, x_5) \wedge U(x_1, x_3, x_5).$

(c) $\varphi_2(x_1, \dots, x_6) := A(x_6, x_5, x_3) \wedge B(x_3, x_4) \wedge C(x_5, x_3, x_2, x_1) \wedge D(x_5, x_3, x_4).$

Give examples of databases and simulate the algorithm explained in the class to evaluate them.

(2) Consider a GHD T with width 3 of a hypergraph \mathcal{H} . This means that there is a node (X, Y) in T such that Y consists of three edges of \mathcal{H} , say A, B, C . Suppose that (X, Y) is the only node with $|Y| = 3$ and that $A \subseteq B \cup C$.

Determine whether the following statement is true or false: *There is a GHD of \mathcal{H} with width at most 2.*

(3) Can you generalize the statement above?