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The conjugacy and the search conjugacy problem in relatively hyperbolic groups.

If u and v are two conjugate elements in a hyperbolic group then the bound on the length of a shortest conjugating element is linear in terms of the lengths of u and v; this was shown by Lysenok in 1989. This estimate leads to an obvious algorithm to solve both the conjugacy and the search conjugacy problems in hyperbolic groups; however, the algorithm has exponential time complexity. In the book by Bridson and Haefliger one finds a polynomial time algorithm to solve the conjugacy problem. Their proof shows the following. There is an easy procedure to choose shorter representatives of the conjugacy classes of u and v. If those representatives are conjugate then the length of a shortest conjugating element is bounded by a constant that depends only on the group presentation. I will explain how these results generalize to relatively hyperbolic groups.