DEFINITION 1 (Penalty(s)): When applying an enhancement to change product p to p', there is a penalty function to measure the change, which is

$$\text{Penalty}(p') = \frac{\sqrt{(p' - p)^2}}{|p|}$$

PROBLEM 1 (Find the enhanced p' to fulfill C with minimal penalty): Given a target region C, where $C \supseteq c$, an enhanced p' should dominate p with the modified region c' satisfies $C \subseteq c'$, while making least penalty. In other words, to:

$$\begin{aligned} &min.\ Penalty(p') \\ &s.t.\ Rank(C) \leq k \end{aligned}$$