Answer To The Question No – 4 (a)

Trust region methods are optimization algorithms that employ a quadratic model to repeatedly approximate the objective function within a trust region. In order to effectively converge to an ideal solution, they dynamically modify the size of the trust region and seek to strike a balance between exploration and exploitation.

Answer To The Question No – 4 (b)

In trust region approaches, how well the previous iteration performed is a key factor in deciding how the subsequent iteration will behave and advance.

The performance of the last iteration in trust region methods determines whether the trust region should be expanded or contracted in the next iteration. The good improvement suggests expanding the trust region, while poor improvement indicates the need for contraction to focus on smaller steps and improve accuracy.

In trust region methods, the outcome of the last iteration influences the selection of step direction and step size in the next iteration. Significant improvement encourages larger steps in the same direction, while small improvement or deterioration may lead to smaller steps or change the search direction.

The performance of the last iteration in trust region methods is evaluated to determine convergence. Significant improvement indicates progress towards an optimal solution, while little or no improvement suggests convergence challenges or a local optimum, triggering further analysis or termination criteria.

Answer To The Question No – 4 (c)

A negative value of ρ in trust region methods indicates a deterioration in the objective function and implies that the proposed step was not beneficial. It is not acceptable because it contradicts the goal of optimization, hampers trust region adaptation, and indicates a lack of progress towards a better solution.