Analysis of a simplex tableau
(ignoring degeneracy)

Is the corresponding solution optimal?

- If there is a negative number in the objective row: No, the corresponding solution is not optimal. (Increasing the value of the corresponding variable will increase the objective value.)

In this case: Is the problem unbounded?

  - If any negative entry in the objective row has no positive numbers above it: Yes, the problem is unbounded. (The value of the corresponding variable can be made arbitrarily large in such a way that no constraints are violated, and this will make the objective value arbitrarily large as well.)

  - If all negative entries in the objective row have at least one positive number above them: No conclusion. (The objective value can be increased by pivoting on a column with a negative entry in the objective row. This will lead to a new tableau. Then analyze the new tableau.)

- If all numbers in the objective row are nonnegative: Yes, the corresponding solution is optimal. (No variable can be increased to increase the objective value.)

In this case: Is this optimal solution unique?

  - If all nonbasic columns have positive entries in the objective row: Yes, the optimal solution is unique. (Bringing any nonbasic variable into the basis will decrease the objective value.)

  - If there is a nonbasic column with a zero in the objective row: No, the optimal solution is not unique. (The value of the corresponding variable can be increased to get a different optimal solution.)

In this case: Is there another optimal basic solution?

  - If there is a nonbasic column with a zero in the objective row and at least one positive number above it: Yes, there is another optimal basic solution. (Pivoting on this column will produce it.)

  - If none of the nonbasic columns having zero in the objective row have positive numbers above: No, there is no other optimal basic solution. (But there are still infinitely many optimal solutions—the set of optimal solutions forms an infinite ray extending from the optimal basic solution.)