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.)