

**Example 11** (from H.P. Williams):

$$\begin{array}{rcllcl}
 \max & x_1 & + & x_2 & & \\
 \text{s.t.} & -2x_1 & + & 2x_2 & \geq & 1 \\
 & -8x_1 & + & 10x_2 & \leq & 13 \\
 & & & x_1, x_2 & \geq & 0 \\
 & & & x_1, x_2 & \in & \mathbb{Z}.
 \end{array}$$

The optimal solution of the relaxed problem is  $x_1 = 4$  and  $x_2 = 4.5$ . If we round  $x_2$  to either of the nearest integers (4 or 5) the solution becomes infeasible. The true integer optimal solution is  $x_1 = 1$  and  $x_2 = 2$  which is quite far away from the continuous optimum and it is not trivial how it can be obtained from the relaxed solution. The diagram of the problem demonstrates the situation.

