Report for group project in INF5870

In this project our group has made a series of programs to find the optimal way for a household to schedule their shiftable electrical appliances. A shiftable appliance is defined as an electrical appliance thatisn’t required to be switched on at specific points of the day. Such as charging of an electrical vehicle, a water heater or a laundry machine.

Conversely, a non-shiftable appliance means they cannot be rescheduled to another timeslot in the day. Like for instance the lights in a house needs to be on whenever people are home and it’s dark outside, or a refrigerator or freezer needs to be on all day. Each house has a limit to how much power the household can consume, wich will be set by the main breaker switch.

Two different pricing schemes are considered in this assignment. Time of Use pricing (ToU), where we assume that the price is 0.50NOK/kWh in non-peak hours and 1.00NOK/kWh in peak hours, and Real Time Pricing (RTP), where the price in non-peak hours is a random number between 0.20 and 1.00 NOK/kWh for every hour, and in peak hours the price is a random number between 0.8 and 2 NOK/kWh.

The pricing scheme considered in all tasks is assumed to be set 24 hours in advance to make the assignment easier for ourselves. It is easier to assign timeslots for appliances when we know what the price will be at each hour of the day.

To do this, we have utilized the function scipy.optimize.linprog on a matrix containing all household appliances to find the optimal schedule with the following constraints:

* Maximum energy drawn by each appliance each hour.
* Each appliance needs to use a certain amount of energy each day-
* Maximum total energy available to the household each hour.

We also assume that each appliance needs to consume a certain amount of energy each day. Which may not necessary be true.