

Exercices du chapitre 2 (cf. note de cours)

4.2 The input-output curve of a gas-fired generating unit is approximated by the following function:

$$H(P) = 120 + 9.3P + 0.0025P^2 \text{ [MBtu/h]} \quad 1 \text{ Btu} = 1055.055 \text{ J}$$

This unit has a minimum stable generation of 200 MW and a maximum output of 500 MW. The cost of gas is 1.20 \$/MBtu. Over a six-hour period, the output of this unit is sold on a market for electrical energy at the prices shown in the table below.

Period	1	2	3	4	5	6
Price[\$/MWh]	12.5	10	13	13.5	15	11

Assuming that this unit is optimally dispatched, is initially on-line and cannot be shut down, calculate its operational profit or loss for this period.

4.4 Assume that the unit of Problem 4.2 has a start-up cost of \$500 and that it is initially shutdown. Given the same prices as in problem 4.2, when should this unit be brought on-line and when should it be shutdown to maximize its operational profit? Assume that dynamic constraints do not affect the optimal dispatch of this generating unit.

4.5 Repeat Problem 4.4 taking into account that the minimum up-time of this unit is four hours.