Corrections to Assignment 2

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1 Question 2b

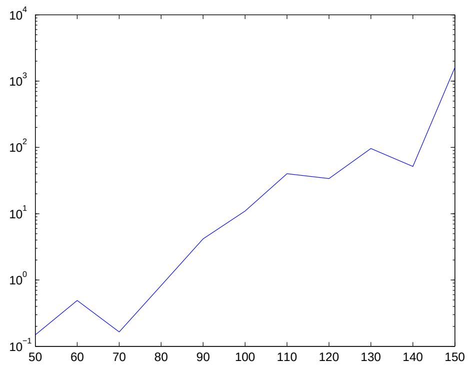
A more exact calculation (or rather, a loop over some possible values of d_t) reveals that the minimum (9 maintenance occasions) is reached at $d_t = 41$.

2 Questions 2c and 2d

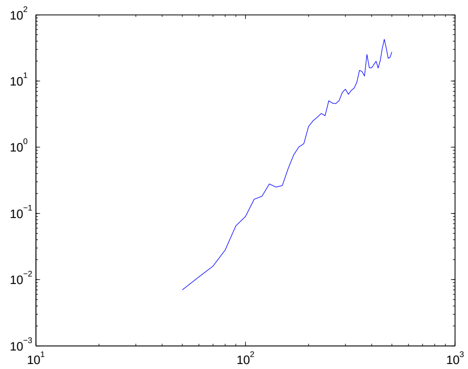
Another way of doing this is to introduce another objective, and use ϵ-constraints to solve the multi-objective function. In that case, we add the objective function (1). In this objective function, p_{it} is a linearly decreasing penalty vector.(We keep the other objective function from the original model, and introduce variables to properly utilize the ϵ constraint method)

$$\sum_{t=1}^{T} \left(\sum_{i \in N} c_{it} x_{it} p_{it} \right) \tag{1}$$

3 Questions 3a and 3b



(a) Unrelaxed integrality constraints



(b) Relaxed integrality constraints

Figur 1: The model takes more time to solve with integrality constraints.

Figure 1a and 1b imply that solving the model with integrality constraints has complexity $O(a^{\gamma x})$, while solving it without these constraints has complexity $O(x^{\gamma})$, where γ is an arbitrary real constant. Clearly, the model with integrality constraints is much harder to solve, as a^x increases much faster than x^a.