ECN 371: Exercise 2

Exercise sets are not to be handed in. At the same time as exercises are put on the WEB page, so are the associated suggestions for answers.

A firm as the following marginal abatement cost curve:

$$MAC_1 = 10 - z$$

where z denotes emissions. Current emissions are 10 units, i.e. $z = 10$.

(a) A tax on emissions is introduced, with the tax rate $t_a = 3$. What is the firm's optimal emission level?

Suppose that a new abatement technology becomes available on the market, so that

$$MAC_2 = 5 - \tfrac{1}{2} z$$

To use the new technology, the firm needs to undertake an investment of 100 money units. Assume (for simplicity) that the lifetime of technology is infinite, and that the real interest rate is 5 %.

(b) Suppose that the firm decided to adopt the new technology, what would the firm's optimal emission level be?

(c) Does it pay for the firm to adopt this new technology? (justify your answer)

(d) Suppose that the tax rate is increased, i.e. $t_b = 4$. Does that change the firm's decision regarding investing in the new technology?

(e) What conclusions do you make regarding the profitability in investments in abatement technology and emission tax rates? (a simple graph may make your discussion easier to follow).