

22.251 System Analysis of the Nuclear Fuel Cycle
Fall 2009
Homework Set #4

This problem set is about material that was covered in class and is also covered in the following textbook:

[CT] = Cochran, R. G. and N. Tsoulfanidis. *The Nuclear Fuel Cycle: Analysis and Management*. 2nd ed. La Grange Park, IL: American Nuclear Society, 1993. ISBN: 9780894484513.

I) [CT] Chapter 4, Problems 4.1 and 4.2

II) [CT] Chapter 5, Problems 5.1 and 5.12

III) Considering the uncertainty of the density of the fuel from problem 4.1, what is the uncertainty about the amount of Pu239 produced that was calculated in Problem 5.12? State your answer in terms of the standard deviation in the calculated total Kg Pu239 .

IV) Considering that the average neutron flux is known with a standard deviation of 1%, what is the uncertainty in Pu239 content calculated in problem 5.12 at the end of one year of operation due to the combined effects of the pellet density and the neutron flux? Consider both a deterministic approach and a probabilistic approach for combining the two effects.

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