Beta Delayed Neutrons and how they effect the Multiplication Factor of Nuclear Reactors

An overall look at nuclear reactor criticality and a simple model of a general nuclear reactor with an emphasis on the multiplication factor and how the stability of a nuclear reactor is created by using techniques to widen the range of the multiplication factor. Included in this analysis are beta delayed neutrons which increase the neutron lifetime and therefore the reactors period. When a reactor reaches criticality, it is effectively time independent and we can use this aspect to simplify the calculations. In sub-critical and supercritical situations that time independence is not a good approximation so we are looking at widening the stability range for criticality so that we can use time independent approximations and specifically study criticality.

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Hi Rebekah, I actually think you’re getting close to a project here, and I think this abstract is not so bad. I’ll give another similar version below.

**Anthony’s Edit:**

Fission Reactor Criticality and Control

Nuclear fission reactors provide an abundant source of energy, but the stringent demands of a modern electrical grid require robust control of the power output and therefore the neutron flux. Here we study the nuclear chain reaction in terms of the criticality requirements and the multiplication factor, k. By studying a simple model of the nuclear chain reaction, and varying parameters we hope to find stability and be able to model our data after known models. We also seek to learn about the response time (or period) of a nuclear fission reaction. Of particular interest is understanding how the presence of -delayed neutrons greatly aids the control of the reactor by decreasing the response time.