These scripts are part of the lecture materials for my courses on reactor physics at Technical University of Munich. 2011 – 2016. The software comes as is, only for educational purposes and no warranties. © Dr.Sdl

In the Fuchs-Nordheim model, the reactor parameters are:

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|  = prompt neutron lifetime (s) |
| *α* = prompt negative temperature coefficient (1/k·dk/dt) |
| *θ* = fuel temperature, |
| h = ratio of peak to average fuel temperature in core |
| C = total heat capacity of metal in core |
| T = reactor period in seconds |

If a sudden insertion of reactivity beyond prompt critical (δkp) is made, the reactor power will initially rise exponentially as exp(t/T) where the period T is given by /δkp. This period will change when appreciable temperature is generated by the pulse. Assuming a constant heat capacity and a shutdown mechanism that is prompt and invariant with temperature, the reactor temperature will rise by δkp/α, until the reactivity inserted beyond prompt critical is just compensated by the fuel temperature rise. The power will then fall to very low values with a temperature overshoot by about a factor of two beyond the temperature at the peak power value (<https://ansn.iaea.org/Common/documents/Training/TRIGA%20Reactors%20(Safety%20and%20Technology)/chapter1/characteristics33.htm)>.