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

The Method of Characteristics (MOC) is often used in spectral codes to calculate the macroscopic cross sections of fuel assemblies. It is very similar to a Monte Carlo approach in the sense that rays of neutrons are tracked through the geometry of the fuel assembly. But while in the analog Monte Carlo method the rays bend and split according to collision events the rays in MOC are always straight. From an ensemble of rays which penetrate the system in all direction the integration of the Boltzmann equation of neutron transport can be approximated. The advantage of MOC is that it is often easier to calculate quantities which are necessary for reactor simulator programs like macroscopic cross section or assembly discontinuity factors. MOC is also usually much faster than Monte Carlo and huge trees of pre-calculated cross sections for different boron concentrations, fuel and moderator temperatures, control rod positions et cetera can be determined. More info see for example: <http://www.mcs.anl.gov/~leyffer/listn/slides-06/mcs_rabiti.pdf> or <https://mit-crpg.github.io/OpenMOC/methods/method_of_characteristics.html> or <http://docs.lib.purdue.edu/dissertations/AAI3263643/>