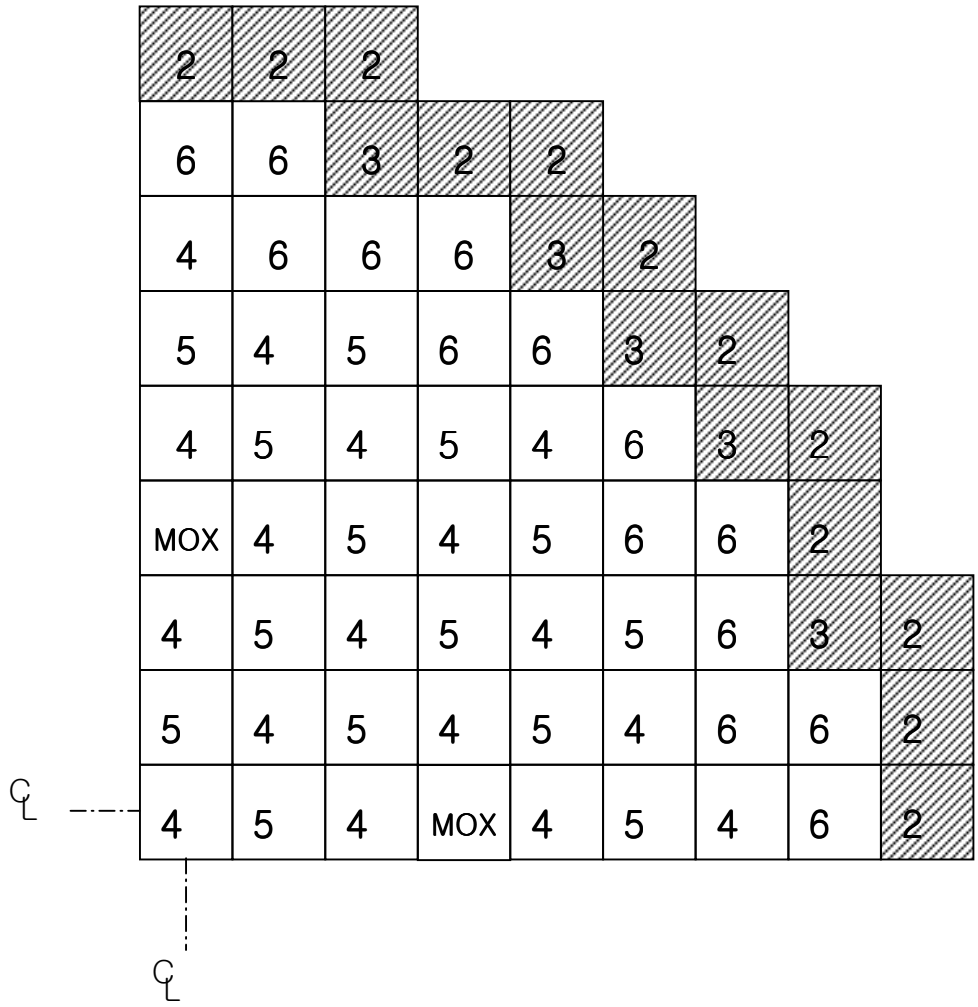
# Benchmark Problem 4A : MOX Fuel-Loaded NEACRP 3-D LWR Core Transient Benchmark Problem

1) Except for the MOX fuel assembly, all the specifications of this problem are the same to those of the NEACRP 3-D LWR core transient benchmark problem, which was originally specified in the following document :

- H. Finnemann and A. Galati, "NEACRP 3-D LWR Core Transient Benchmark Final Specifications," NEACRP-L-335 (Revision I), January 1992.

2) MOX-loaded Core Configuration (1/4 Core)
(This figure corresponds to Fig. 2.4 of the original specifications.)



3) Data for MOX assembly

- Download : Bench4A_MOX.txt (text file format)

a) Macroscopic cross sections and their derivatives for MOX assembly

| | | | | |
|---|---|---|---|---|
| .302251E+00 | .118722E-01 | .152624E-01 | .843812E-02 | .292685E-02 |
| .112006E+01 | .220254E-00 | .307868E-00 | .109289E-00 | |
| .602000E-06 | .540000E-08 | .218200E-06 | .158300E-07 | .549081E-08 |
| .205000E-05 | .875200E-05 | -.876000E-06 | -.310969E-06 | 1200.2 |
| .255922E-05 | -.180728E-06 | .259806E-06 | .379320E-07 | .131571E-07 |
| -.207728E-03 | -.183981E-06 | .230243E-04 | .817333E-05 | 306.6 |
| .212257E+00 | .232034E-01 | .530104E-02 | .160322E-02 | .556096E-03 |
| .127938E+01 | .308659E-01 | .829710E-02 | .294537E-02 | 0.7125 |
| .892592E-04 | -.240664E-04 | .412474E-04 | -.141976E-05 | -.492458E-06 |
| .136480E-03 | .118380E-03 | .230581E-03 | .818534E-04 | 891.45 |

(The format of this table is the same to that of Table 2.4 of the original specifications.)

b) Velocities and energy release of prompt neutrons of MOX assembly

neutron velocity (fast, thermal) = (2.26E7, 4.95E5) cm/s

energy release (fast, thermal) = (0.3396E-10, 0.3387E-10) Ws/fission

c) Decay constants and fractions of delayed neutrons of the MOX assembly

| Total fraction of delayed neutrons | | | 0.0040157 | | | |
|---|---|---|---|---|---|---|
| G | 1 | 2 | 3 | 4 | 5 | 6 |
| Decay constant ($s^{-1}$) | 0.0129 | 0.0311 | 0.134 | 0.331 | 1.26 | 3.21 |
| Relative fractions | 0.02453 | 0.19186 | 0.1541 | 0.353 | 0.20373 | 0.07278 |