

CHAPTER I
INTRODUCTION



Regarded as a source of neutrons, a reactor will contain neutrons of all energies from the maximum energy in the fission spectrum down to the thermal distribution of energies. Fast neutrons are continually produced by the nuclear fission. As a result of the slowing down process, the neutrons arrive at energies corresponding to the thermal energies of the moderator nuclei. Such neutrons are called thermal neutrons, and they follow an approximately Maxwellian distribution. The neutrons that are in the process of being slowed down are called resonance neutrons. The presence of resonance neutrons interferes with the measurement when it is desired to observe the effects of thermal neutron only. By measurement of cadmium ratio, one can determine the ratio of the intensity of thermal neutrons to that of the resonance neutrons. Cadmium has a high absorbing ability for neutrons below approximately 0.4 eV and low cross section for neutron above this energy. From a measurement of cadmium ratio, the epithermal index r , which represents the relative strength of the epithermal component of the neutron spectrum can be calculated.