

## **B The reason of validity of cold plasma dielectric tensor in the calculation of harmonic damping rates( $n \geq 2$ )**

Ans.)

In the first harmonic damping  $\omega = |\Omega|$ . In this case,  $\epsilon_{xx}$ ,  $\epsilon_{xy}$ ,  $\epsilon_{yx}$  is infinite. Thus, the finite electron temperature effect is included in the dielectric tensor in order to find the electric fields at resonance for the first harmonic damping. In other words, the finite cyclotron radius effect is included to the first order in the temperature for those terms that are large near resonance. But, in the higher harmonic damping,  $\omega = n|\Omega|$  ( $n \geq 2$ ). Then, the dielectric tensor S, D, P are not infinite at resonance. Thus, the cold plasma dielectric tensor is valid in the higher harmonic damping.