

Concepts

概念

主要概念与定义 Main concepts and definitions

磁导率 Permeability

在磁路中存在气隙，即非闭合磁路条件下，测得的磁导率为有效磁导率 μ_e ：

g 是气隙长度， L_e 是有效磁路长度。这一表示，仅是小气隙 g 下的一种近似。在大气隙下，磁通要穿过气隙的外部，其有效磁导率将大于按上式计算所得之值。

For unclosed magnetic circuit with a gap, measured permeability is called effective permeability expressed as μ_e :

where g is the length of the gap, and L_e the effective length of the magnetic circuit. It notes that this equation only an approximation of μ_e for the small gap. For large gap, the effective permeability will larger than that calculated using above equation.

$$\frac{\mu_i}{1 + g\mu_i / L_e} = \mu_e$$

在没有偏置磁场的情况下，磁场 H 较大时，该磁场 H 产生磁通密度 B ，则这时的磁导率，

称振幅磁导率。

Current induces magnetic field. In spiral coils, the magnetic field (H) induced by current can be expressed as:

is called amplitude permeability.

$$\frac{1}{\mu_0} \frac{B}{H} = \mu_a$$

在具有直流偏置磁场时，再加上一个交流磁场，这时测得的磁导率称为增量磁导率。在直流迭加状态下测得的电感，计算出的磁导率近似于增量磁导率。

In an alternate field with a DC bias field, the permeability is called incremental permeability. For the electric inductance measured in the AC field superposed with a bias DC field, the permeability is probably also the incremental permeability.

$$\frac{1}{\mu_0} \left[\frac{\Delta B}{\Delta H} \right]_{H_{DC}} = \mu_\Delta$$

上述的磁导率都是频率较低，或接近直流状态下测得的磁导率，在频率较高时，其磁导率表现为复数磁导率。

The permeability in above are all obtained in the frequency or near to DC situation. When the frequency is high, the permeability is complex.

在串联电路中为

In parallel circuit

$$\mu = \mu'_s - j\mu''_s$$

在并联电路中为

In serial circuit

$$\frac{1}{\mu} = \frac{1}{\mu'_p} - \frac{1}{j\mu''_p}$$

$\mu'_s, \mu''_s, \mu'_p, \mu''_p$ 都是频率的函数。

$\mu'_s, \mu''_s, \mu'_p, \mu''_p$ are all the functions of frequency.

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