May 28, 2018

< Interpretation on the analytic approch in Ch. 13 >

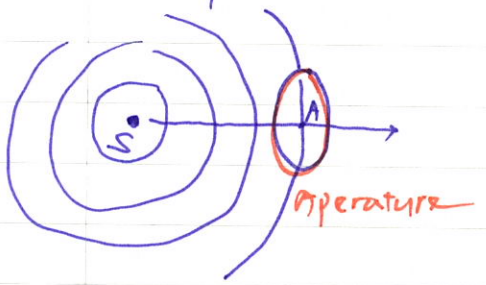
A. Aperature Case (13-4)

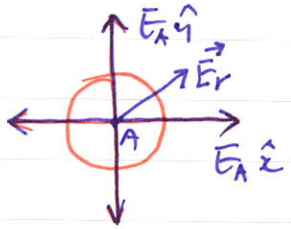
- Light Sourie : point source for radial illumination
  to fit symmetry relation on the aperature

B. Slit Case (13-7)

- Light Source : slit source (not diffracted!)
  for the symmetry relation on the slit geometry.
  → Sylindrical analysis

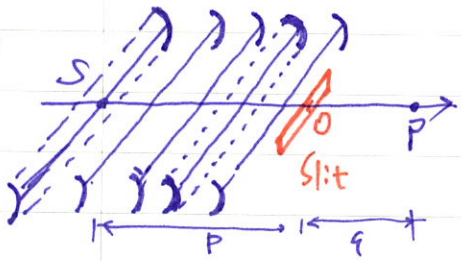
A.

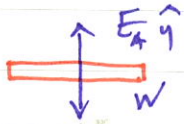




< radial integration >

B.





< linear integration >

< Interpretation on I_0 in Eq. 13-35 >

- By definition of intensity itself,

  $I_0 = (\text{Energy})_0 / \text{Area}$

- Because the electric field $E(r)$ in the case of B, is inversely proportional to $\sqrt{r}$, I_0 depends on both position r and the (unit) Area.
- Here, if the I_0 should be at the slit position O on the axis.
- So, at P, $I_p < I_0$ if there is no slit, because $I \propto \frac{1}{r}$. (for the unit area)

Then, how $I_u(p) > I_o(0) (2I_o)$? (see 13-37)

- The orignal field equation is given by (13-24), where the value depends on area integration.
- The A_p in the Fresnel integral form is modified C_1. in Eq. (13-24), satisfying $\sqrt{L}$ or $1/\sqrt{\text{distance}}$.
- As long as C_1 (the point soure S-dependent) is not defined, A_p is an arbitrary number, whete its reference is given by I_u. ($I_u = 2I_o$)
  ($A_p \equiv C_1 w\sqrt{\frac{L\lambda}{2}}$)
- In other words, I_u is rather a reference!
- By the way, at the souree point E_s is not defined due to singularity matter! ($E_r = E_s/\sqrt{r}$)
  ($r \to 0$, $E_r \to \infty$)
  $A_r \to \infty$