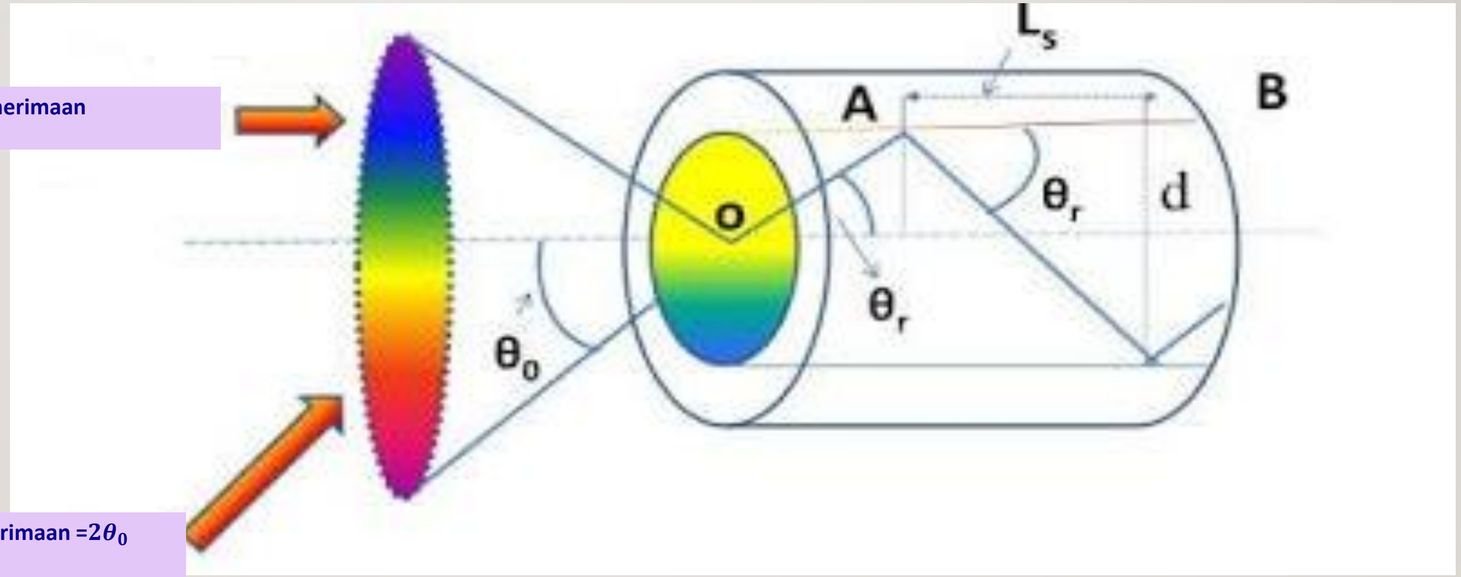
SISTEM KOMUNIKASI OPTIK

- BAB 2
- KERUCUT PENERIMAAN DAN
- NUMERICAL APARTURE PADA SERAT OPTIK

- D3 Teknik Telekomunikasi – Fakultas Ilmu Terapan

KERUCUT PENERIMAAN

Kerucut Penerimaan

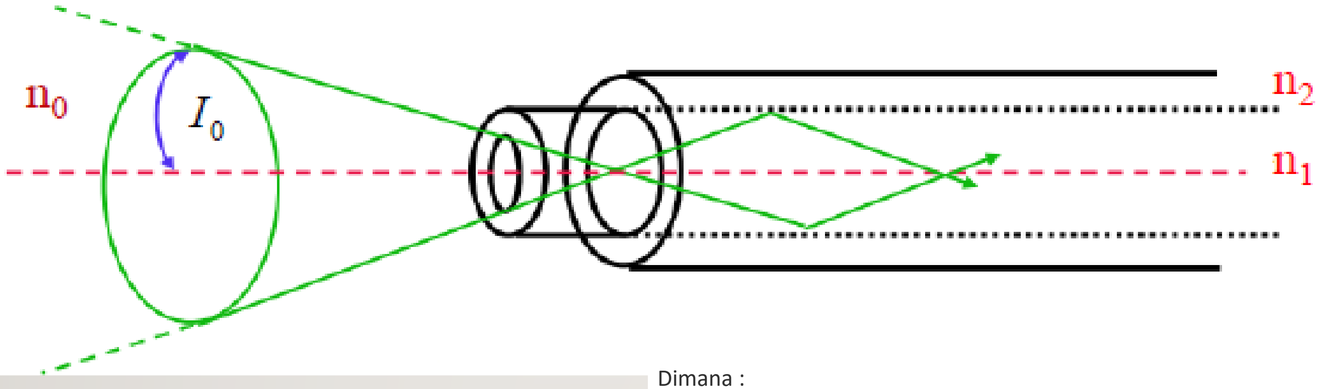


Besarnya Kerucut Penerimaan =$2\theta_0$

$2\theta_0$ = SUDUT KERUCUT PENERIMAAN

Sumber Referensi : https://www.quora.com/What-does-it-mean-to-inject-light-at-a-certain-angle-into-an-optical-fiber
Gerd,Keiser,2010, *Optical Serat Communications*, 4th edition,McGraw Hill, International Edition

NUMERICAL APARTURE



$$NA = \frac{\sqrt{n_1^2 - n_2^2}}{n_0}$$

Dimana :
NA = Numerical Aparture
n_1 = indeks bias core
n_2 = indeks bias cladding
n_0 = indeks bias medium pelepasan

Jika n_o = 1 maka ;

$$NA = \sqrt{n_1^2 - n_2^2}$$

$$I_0 = Kerucut\ Penerimaan = Sin^{-1}\ NA$$

Sumber Referensi : https://www.quora.com/What-does-it-mean-to-inject-light-at-a-certain-angle-into-an-optical-fiber
Gerd,Keiser,2010, *Optical Serat Communications*, 4th edition,McGraw Hill, International Edition

NUMERICAL APARTURE PADA SERAT OPTIK GRADDED INDEX

4

$$NA(r) = \begin{cases} NA(0)\sqrt{1-\left(r/a\right)^{\alpha}}, \ldots\ldots\ldots r \le a \\ 0, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots r > a \end{cases}$$

$$NA(0) = \sqrt{n_1^2 - n_2^2} = n_1\sqrt{2\Delta}$$

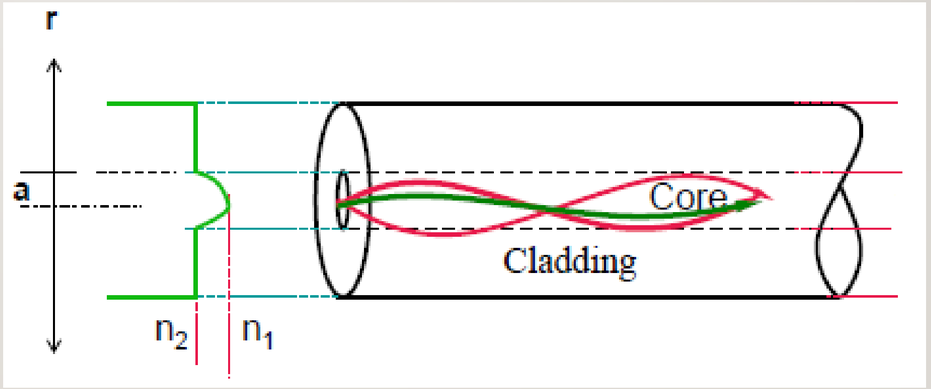
Keterangan:

NA(0) : *numerical aperture pada pusat core-nya*

a : *radius core (jari-jari core)*

r : *radial distance from the center core*

α : *shape of the index profile*



Sumber Referensi : http://www.thefoa.org/tech/ref/basic/fiber.html
Gerd,Keiser.,2010, *Optical Serat Communications*, 4th edition,McGraw Hill International Edition

LATIHAN SOAL

5

Hitung NA dari serat optik step index n_1 = 1,46 dan n_2 = 1,42. Tentukan juga sudut masuk maksimum (I_0) jika media di luarnya adalah udara dengan n_0 = 1?

Jawab :

Jika n_o = 1 maka ;

$$NA = \sqrt{n_1^2 - n_2^2}$$

$$NA = \sqrt{1.46^2 - 1.42^2} = 0.3394$$

$$I_0 = Kerucut\ Penerimaan = Sin^{-1}\ NA$$

$$= Sin^{-1}\ (0.3394)$$

$$I_0 = 19.84^0$$

Sumber Referensi :
Gerd,Keiser.,2010, *Optical Serat Communications*, 4th edition,McGraw Hill, International Edition

TERIMA KASIH

UNITED STATES OFFICE

1243 Barker Cypress

San Francisco, California

EUROPE OFFICE

13 Ave. Ballarta

Barcelona, Spain

SOUTH AMERICA OFFICE

45 Calle Norte

Argentina