

Above the grating:

$$U_z^{(2)} = A_0^{(2)} \exp(i\alpha_0 x - i\beta_0^{(2)} y) + \dots$$

(incident)

Refractive index $v_2 = 1$
(vacuum)

2

Refractive index v_1
(possibly complex, lossy)

1

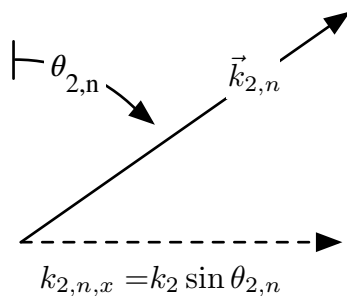
$$\alpha_0 = k_2 \sin \theta_2$$

$$\alpha_n = \alpha_0 + \frac{2\pi n}{d}$$

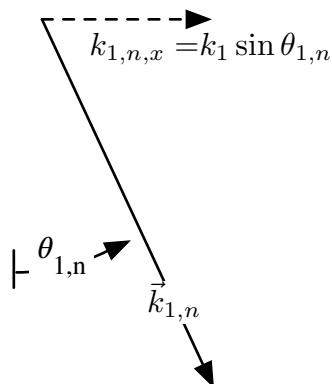
Inside the grating: $U_z^{(1)} = A_{-N}^{(1)} \exp(i\alpha_{-N} x + i\beta_{-N}^{(1)} y) + \dots +$

$$B_{-N}^{(2)} \exp(i\alpha_{-N} x + i\beta_{-N}^{(2)} y) + \dots + B_{-1}^{(2)} \exp(i\alpha_{-1} x + i\beta_{-1}^{(2)} y) + B_0^{(2)} \exp(i\alpha_0 x + i\beta_0^{(2)} y) + B_1^{(2)} \exp(i\alpha_1 x + i\beta_1^{(2)} y) + \dots + B_N^{(2)} \exp(i\alpha_N x + i\beta_N^{(2)} y)$$

$$A_{-N}^{(1)} \exp(i\alpha_{-N} x + i\beta_{-N}^{(1)} y) + \dots + A_{-1}^{(1)} \exp(i\alpha_{-1} x + i\beta_{-1}^{(1)} y) + A_0^{(1)} \exp(i\alpha_0 x + i\beta_0^{(1)} y) + A_1^{(1)} \exp(i\alpha_1 x + i\beta_1^{(1)} y) + \dots + A_N^{(1)} \exp(i\alpha_N x + i\beta_N^{(1)} y)$$



Reflected wavevectors $\vec{k}_{2,n}$



Transmitted wavevectors $\vec{k}_{1,n}$