

## M1FRFOR

### Solving linear equations for Fresnel's Formulas

#### 1. Parallel Case

Given

$$\cos r \cdot r_p + \cos t \cdot t_p = \cos i$$

$$n_1 \cdot r_p - n_2 \cdot t_p = -n_1$$

$$\text{Find}(r_p, t_p) \rightarrow \begin{bmatrix} \frac{-(-n_2 \cdot \cos i + \cos t \cdot n_1)}{(\cos r \cdot n_2 + \cos t \cdot n_1)} \\ n_1 \cdot \frac{(\cos r + \cos i)}{(\cos r \cdot n_2 + \cos t \cdot n_1)} \end{bmatrix}$$

#### 2. Perpendicular case

Given

$$n_1 \cdot \cos r \cdot r_s + n_2 \cdot \cos t \cdot t_s = n_1 \cdot \cos i$$

$$r_s - t_s = -1$$

$$\text{Find}(r_s, t_s) \rightarrow \begin{bmatrix} \frac{-(-\cos i \cdot n_1 + n_2 \cdot \cos t)}{(\cos r \cdot n_1 + n_2 \cdot \cos t)} \\ n_1 \cdot \frac{(\cos r + \cos i)}{(\cos r \cdot n_1 + n_2 \cdot \cos t)} \end{bmatrix}$$