

$$t_{Ps}(p_i) = H \left[\sqrt{R^2 - p_i^2 V_p^2} - \sqrt{1 - p_i^2 V_P^2} \right] \quad (1)$$

$$t_{Pps}(p_i) = H \left[\sqrt{R^2 - p_i^2 V_p^2} + \sqrt{1 - p_i^2 V_P^2} \right] \quad (2)$$

$$t_{Pss}(p_i) = 2H \sqrt{R^2 - p_i^2 V_p^2} \quad (3)$$

$$t_{Pss}(p_i) = \frac{\sqrt{R^2 - p_i^2 V_p^2} + \sqrt{1 - p_i^2 V_P^2}}{\sqrt{R^2 - p_i^2 V_p^2} - \sqrt{1 - p_i^2 V_P^2}} t_{Ps}(p_i) \quad (4)$$

$$t_{Pss}(p_i) = \frac{2\sqrt{R^2 - p_i^2 V_p^2}}{\sqrt{R^2 - p_i^2 V_p^2} - \sqrt{1 - p_i^2 V_P^2}} t_{Ps}(p_i) \quad (5)$$