

**ClearAll["Global`\*"]**

**PT = 10<sup>4</sup>; PR = 10<sup>-10</sup>; Ga1 = 10<sup>3.5</sup>; Ga2 = 10<sup>2</sup>; R1 = 10 000; R2 = 5000;  
Z0 = 120 π; f = 10 × 10<sup>9</sup>; c = 3 × 10<sup>8</sup>; λ = c / f; λ = 3 × 10<sup>8</sup> / f;**

1. a)

$$PR = PT \frac{\lambda^2 Ga1 Ga2}{(4 \pi)^3 R1^2 R2^2} \sigma$$

$$\sigma = \frac{PR (4 \pi)^3 R1^2 R2^2}{PT \lambda^2 Ga1 Ga2}$$

174.312

$$\theta_B = \sqrt{\frac{4 \pi}{Ga1}} / \circ$$

3.61183

1. c)

**prf = 3000; ωrpm = 15;**

$$n = \frac{\theta_B prf}{6 \omega rpm}$$

120.394

1. d)

**c = 3 × 10<sup>8</sup>; f = 10 × 10<sup>9</sup>; λ = 3 × 10<sup>8</sup> / f;**

$$vb2 = \lambda prf (* vbn=n \lambda prf/2 *)$$

90

$$vb2kmh = vb2 \times 3.6$$

324.

$$v1kmh = (vb2kmh - 5)$$

319.

$$v1 = v1kmh / 3.6 (* m/s *)$$

88.6111

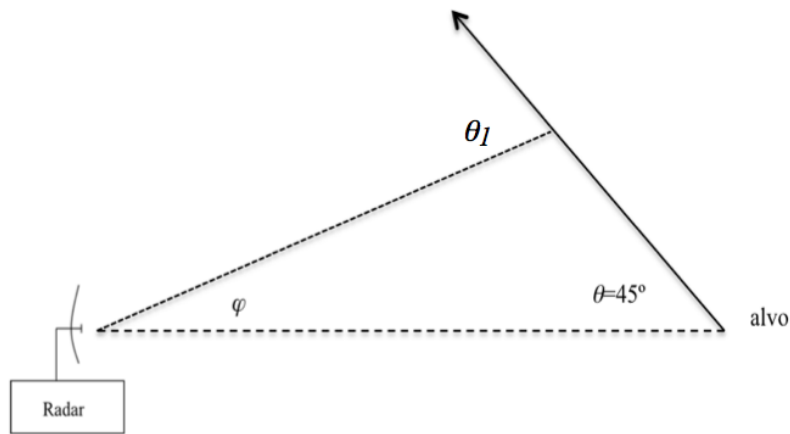
A gama de velocidades com sobreposição com o clutter seria então [319, 324]km/h

2.

frequência, f= 3 GHz

v=360 km/h , 100 m/s

prf=1200



2. a)

$$v_{\text{kmh}} = 720; v = v_{\text{kmh}} / 3.6; f_{\text{GHz}} = 3; \lambda = 0.3 / f_{\text{GHz}}; \text{prf} = 1200;$$

$$\theta_1 = \text{ArcCos}[\text{prf} \lambda / (2 v)] / ^\circ$$

$$72.5424$$

$$\theta_0 = 45;$$

$$\varphi_1 = \theta_1 - \theta_0$$

$$27.5424$$

$$\theta_2 = \text{ArcCos}[2 \text{prf} \lambda / (2 v)] / ^\circ$$

$$53.1301$$

$$\varphi_2 = \theta_2 - \theta_0$$

$$8.1301$$

$$\theta_3 = \text{ArcCos}[3 \text{prf} \lambda / (2 v)] / ^\circ$$

$$25.8419$$

$$\varphi_3 = \theta_3 - \theta_0$$

$$-19.1581$$

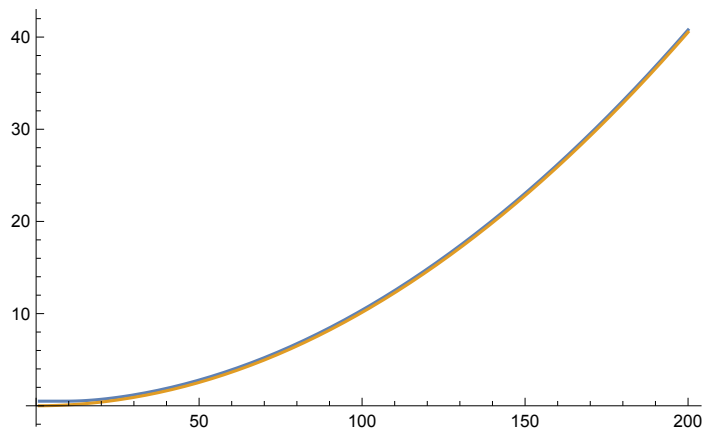
2. b)

$$AC = \frac{\int_0^\infty W_0 e^{-\frac{f^2}{2\sigma_c}} df}{\int_0^\infty W_0 e^{-\frac{f^2}{2\sigma_c}} 4 \sin^2(\pi f T_p) df} = \frac{0.5}{1 - e^{-2\pi^2 T_p^2 \sigma_c^2}}; i$$

$$\approx \frac{f_p^2}{4\pi^2 \sigma_c^2} = \frac{f_p^2 \lambda^2}{16\pi^2 \sigma_v^2}$$

$$\sigma_c = 5; AC = 1000;$$

Plot[ $\left\{\frac{0.5}{1 - e^{-\frac{2 \pi^2 \sigma c^2}{x p^2}}}, x p^2 / (4 \pi^2 \sigma c^2)\right\}, \{x p, 1, 200\}$ ]



$$f_p = 2 \cdot \pi \sigma c \sqrt{A C}$$

993.459

Compressão

$$T = 30 \times 10^{-6}; \mu = 0.5 \times 10^6 / 10^{-6}$$

$5. \times 10^{11}$

$$B = \mu T$$

$$1.5 \times 10^7$$

Taxa de compressão LFM,  $T_c = B T$

$$T_c = B T$$

$$450.$$

Taxa de compressão Cod Fase,  $T_c = n \quad n =$

$$n = T / (40 \times 10^{-9})$$

$$750$$

3. d) ver problema 5.2