P2.

```
TA = 290; F = 10; Teq = F TA
```

2900

```
PRF = 1500;
θB = 2;
ωrpm = 9;
n = θB × PRF / (6 × ωrpm)
```

$\frac{500}{9}$

Número de impusos/ number of pulses = 55;

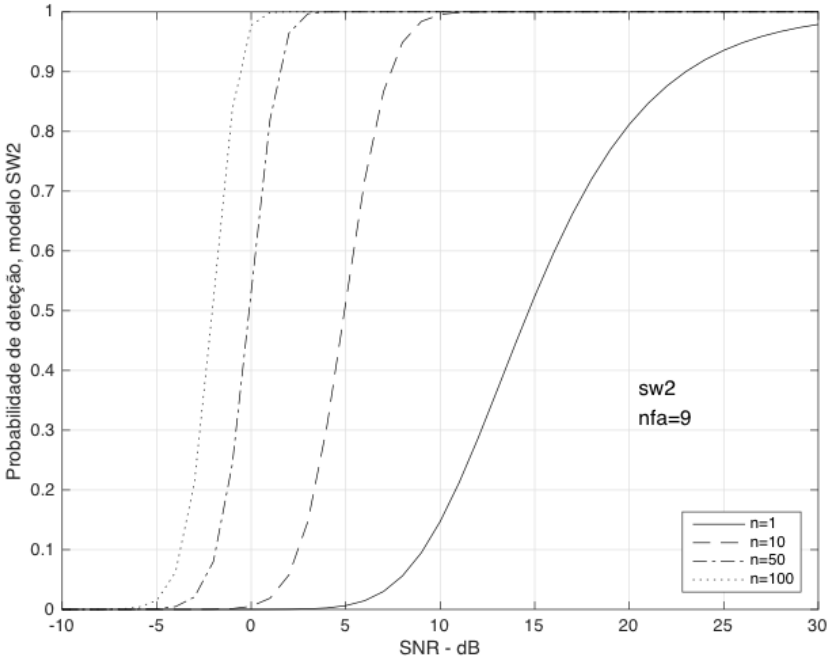
```
τ = 1.5 × 10^-6; B = 1 / (2 τ);
Δf = B
```

3.333×10^5

```
PT = 10^5; λ = .3 / 2.7; G = 1000; σav = 10;
K = 1.38 × 10^-23;
```

$$\text{Rmax} = \left(\frac{\text{PT}\ \lambda^2\ \text{G}^2\ \sigma\text{av}}{(4\ \pi)^3\ \text{K}\ \text{Teq}\ \Delta\text{f}\ \text{SN1, 50}} \right)^{1/4}$$

```
(* Nas condições do enunciado vale SW2
  SN1dB ≃2; according to the stated
  in the problem we consider SW2 and SN1dB ≃2*)
```



$$SN1dB = 2;\ SN1 = 10^{SN1dB/10.}$$

1.585

$$Rmax = \left(\frac{PT\ \lambda^2\ G^2\ \sigma av}{(4\ \pi)^3\ K\ Teq\ \Delta f\ SN1}\right)^{1/4}$$

131 000.

P 3

$$v = 250;\ \lambda = 0.03;$$

$$\theta e = 20\ °;\ \theta a = 30\ °;$$

$$fd = \frac{2\ v}{\lambda}\ Cos[\theta e]\ Cos[\theta a]$$

1.356×10^4

Como fm ≃ 2 fd, as componentes espectrais em fd e fm - fd podem ser confundidas
As fm ≃ 2 fd, the spectral lines at fd and fm - fd can be mis-interpreted

b)

$$D = \frac{\Delta f}{fm}\ sin\left(2\ \pi\ fm\ R / c\right)$$

J0(D) = 0 ocorre para/(occurs for) D=2.4

$$c = 3 \times 10^8;\ fmod = 40\,000;\ \Delta f = 0.5 \times 10^6;$$

$$R = \frac{c}{2\ \pi\ fmod}\ ArcSin\left[\frac{2.4\ fmod}{\Delta f}\right]$$

230.6

P 4

b)

Velocidade do radar relativa ao solo/ radar velocity relative to ground

vradar = 600 /3.6 → 166.7 ms^{-1}

Velocidade relativa entre alvo e rada / relative velocity radar - target

r → vradar + | va | = 200 ms^{-1}

fGHz = 5.25; λ = 0.3 / fGHz → λ = 0.05714

Desvio Doppler do alvo/ Doppler shift,

fd = 2 (vradar + |va|) / λ → 7000 Hz

Nota: deverá ser/ Note: it should be

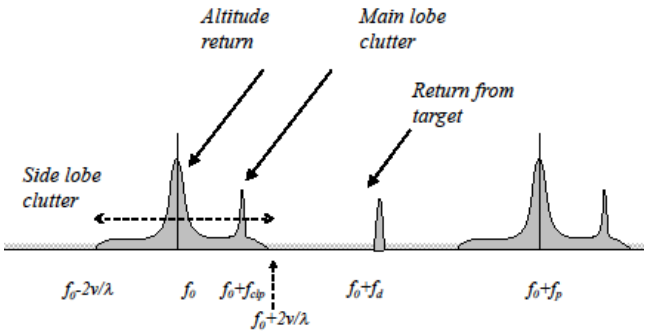
fd > 2 vradar / λ = 5833 Hz

e /and f0 + fp - (f0 + fd) > 2 vradar/λ

isto é/ that is

fp > 2 vradar / λ + fd → fp > 12.83 pps (kHz)

ou seja/ thus → prfmin = 12.83 kHz



c)

posição do desvio Doppler do alvo a1

Doppler shift for target a1

va1 = -250 / 3.6 → -69.44 ms^{-1}

fda1 = 2 (vradar - | va1 |) / λ → 3403 Hz

posição do desvio doppler do alvo 2

Doppler shift for target 2

va2 = 250 / 3.6 → 69.44 ms^{-1}

fda2 = 2 (vradar + |va2|) / λ → 8264 Hz

extensão do espectro do clutter de solo

extension of the clutter Doppler spectrum due to ground

2 vradar / λ → 5833 Hz

A posição do desvio doppler do alvo 1 encontra-se incluída no espectro do clutter, logo o cancelamento poderá não ser efetivo. O oposto sucede para o alvo 2.

Doppler shift for target 1 is within the clutter spectrum, thus cancellation is not guaranteed.
The opposite prevails for target 2