SAR signal capture

Fourier Shift Theorem

$$G(f) = \mathcal{F}\{g(t)\}$$

$$G(f-f_0) = g(t)\exp(i 2\pi f_0 t)$$

i : imaginary

$$e^{i\theta} = \cos\theta + i\sin\theta$$

(follow by Low Pass filter)

→ down convert in frequency

RF → baseband

left with 0-15 Mhz chirp

sample according to Nyquist

⇒ 2x / cycle @ highest freq. present

(ERS) quantized @ 5 bits

xmit to receiving station

$\cos(a) \times \cos(b) = \underbrace{\frac{1}{2}\cos(a-b)}_{\text{LF}} + \underbrace{\frac{1}{2}\cos(a+b)}_{\text{HF}}$

mixing, demodulation, freq. down convert

Low Pass Filter X

all signal processing steps : preserve phase