**Tutorial Doppler**

A Radar working at the carrier frequency of 2 GHz is used for airspace monitoring.

1. Compute the range resolution of the radar if it transmits a rectangular pulse of the duration of 10 microseconds with no further processing applied to the received signal.
2. What is the resolution after matched filtering if the pulse is now a chirp with 500 MHz bandwidth and the same duration in (a)?
3. The radar uses a Pulse Repetition Frequency of 2 kHz, what is the maximum speed of a target that can be detected unambiguously?
4. As it performs Doppler processing every 32 pulses, what is its speed resolution?