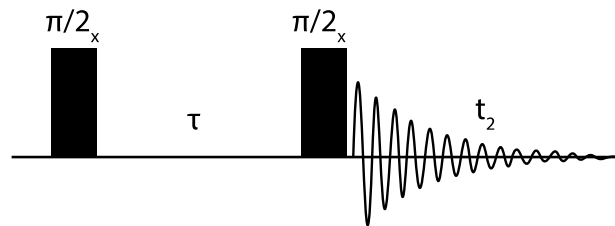


Jigsaw 5C

Vector Model: Effect of pulses

1. A pulse sequence is shown below.



- a. Use vector diagrams to predict the outcome of the sequence when applied to equilibrium magnetization. In your answer, set up a table describing the values of x-, y- and z- magnetizations after each element of the pulse sequence.
- b. For a fixed delay τ , sketch a graph of the x- and y-magnetization as a function of the offset Ω between the transmitter frequency and Larmor frequency $\Omega = (\omega\tau - \omega_0)$ during t_2 .
- c. At what values of $\Omega\tau$ do any nulls occur?
2. In a simple pulse-acquire experiment, to determine a pulse length, an operator observed a positive signal for pulse lengths of 5 and 10 μs . As the pulse was lengthened further the intensity decreased, went through a null at 20.5 μs and then became negative.

- a. Explain what is happening in this experiment.

- b. Use the data to determine the RF field strength in Hz and in $\text{rad}\cdot\text{s}^{-1}$.

- c. Find the length of a 90° pulse.

- d. At what pulse length will the next null be observed?