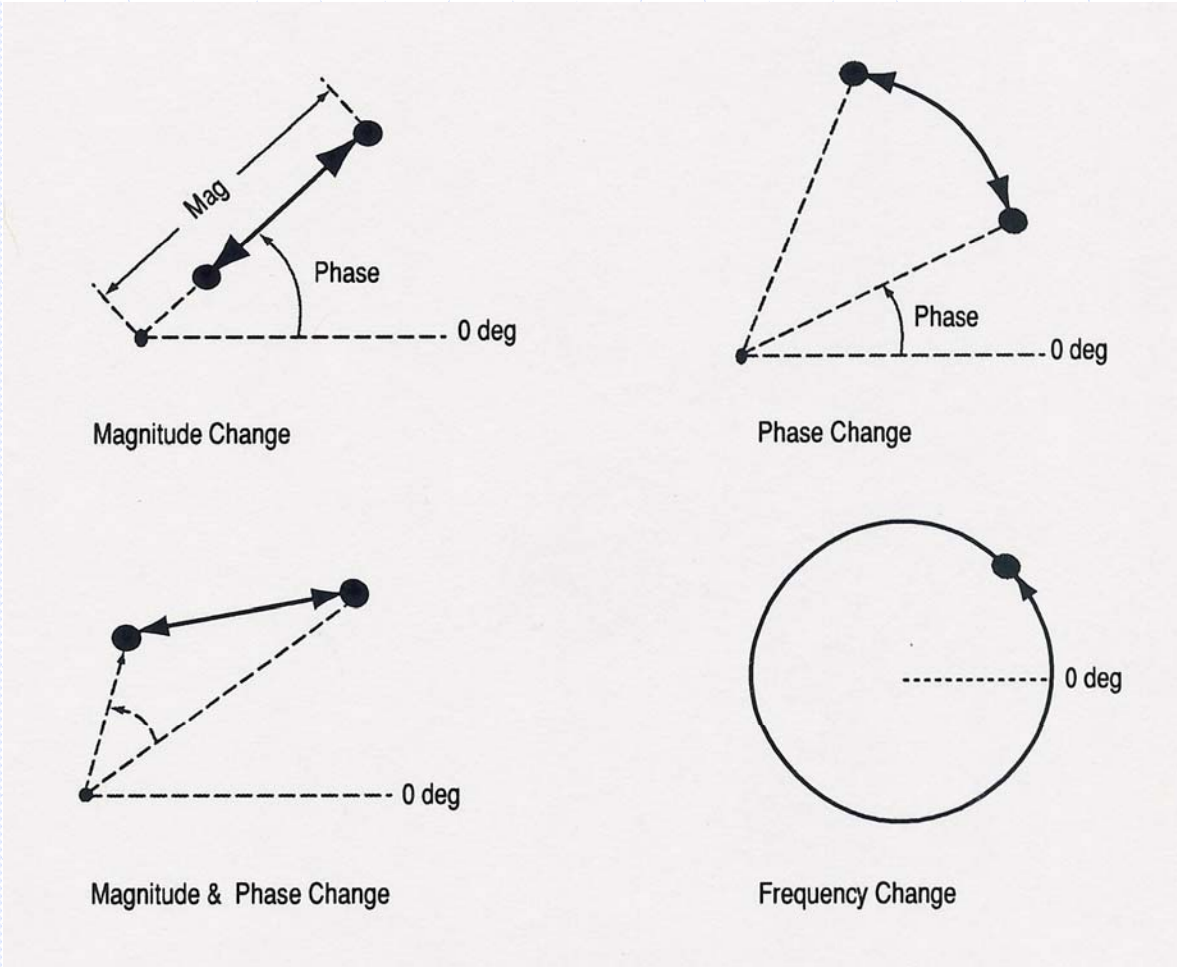
Vector Signal Analysis of Frequency Modulated Signals

by Dr. Thad B. Welch, PE

AM Demodulation Project

- What was the,
  - message?
  - sample frequency?
  - length of the message?
  - bandwidth of the message?
- How would you get the I and Q signal from a high-speed sampling system (e.g., a fast O-scope)?

The Effect of Modulation



FM Demonstration Using An RF Signal Generator

Demonstration Using A Real FM Station

KCGY ... FM 95.1 [www.FCC.gov]

- KCGY WY LARAMIE USA
- Daytime Licensee: CLEAR CHANNEL BROADCASTING LICENSES, INC.
- 'Full Service' FM station
- 41° 18' 34.00" N Latitude
- 105° 27' 11.00" W Longitude
- ERP:100 kW (horizontal) 100 kW (vertical)
- Antenna Height Above Average Terrain: 305 meters
- Antenna Height Above Mean Sea Level: 2724 meters
- Antenna Height Above Ground Level: 35 meters

Homework

- Demodulate the data contained in the FM_99_1_dev_5000_msg_1000_span_50.mat file … netuser drive (EE4800-04)
  - Load the .mat file
  - Develop and execute your own demodulation routine
  - MATLAB commands … double, psd, sound, soundsc, angle, unwrap, diff, and load may be helpful
    - What is the message?
    - What is the sample frequency (in Hz)?
    - How long (in seconds) is the recording?
    - What is the bandwidth of the signal (in kHz)?