

# **DISCO Project - Never Overtime**

**Modulation  
of FSK and  
NBFM**

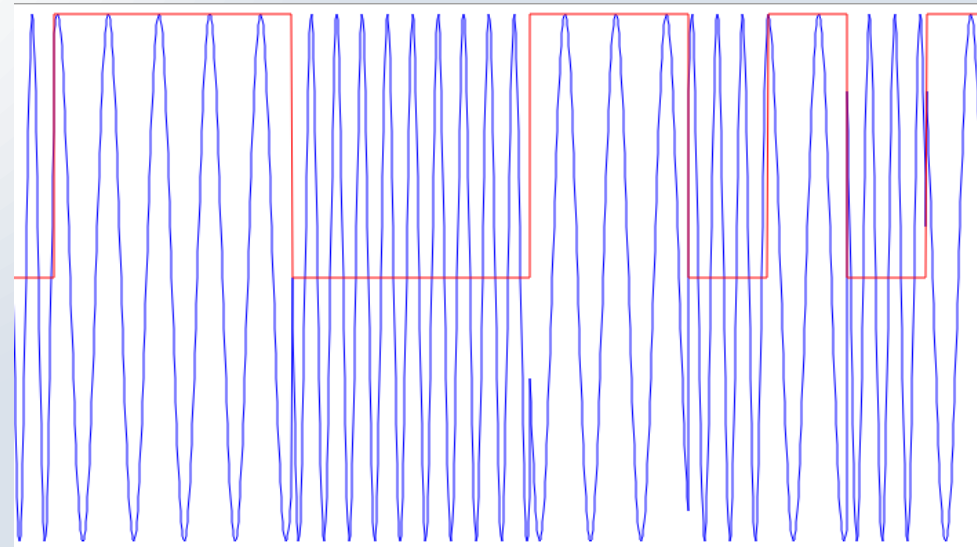
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# Content

- Definition of FSK
- FSK modulation in GNU Radio
- Definition of Narrow Band FM
- NBFM modulation in GNU Radio
- Difference between FSK and NBFM

# Definition FSK

- Stands for Frequency Shift Keying
- Digital modulation technique
- carrier frequency is shifted between two or more discrete frequencies to transmit digital data
- For example:
  - zeros at 2kHz and
  - ones at 1kHz



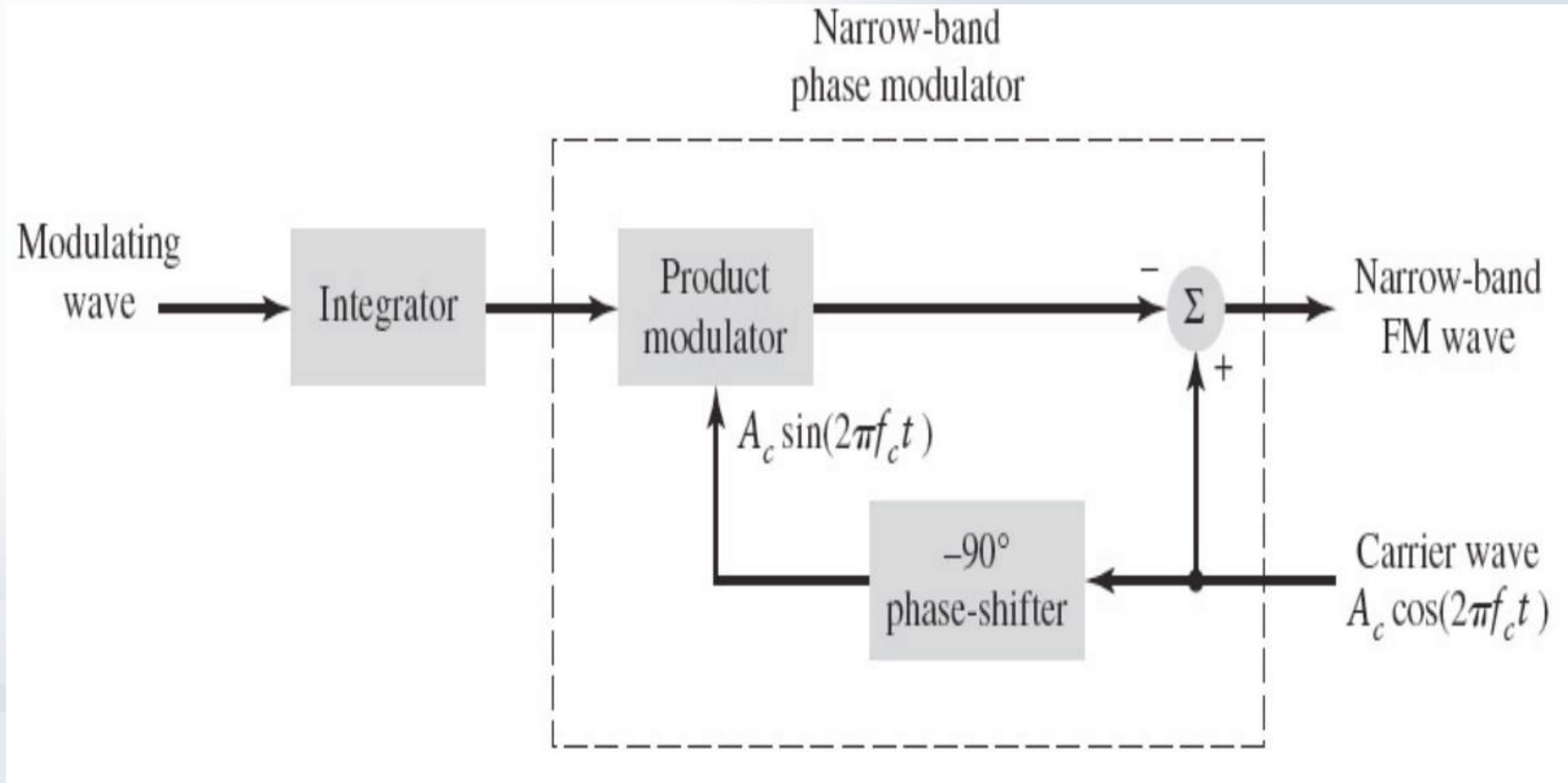
# Definition (NB)FM

- Used for analog Radio communication
- Carrierfrequency is modulated by input
- Narrow because Signal is more compact to reduce interferences

# Definition Narrow Band FM

$$s(t) \approx A_c \cos(2\pi f_c t) - \beta A_c \sin(2\pi f_c t) \sin(2\pi f_m t)$$

# Definition Narrow Band FM



# Difference FSK and (NB)FM

- Signal type
  - FSK: digital
  - FM: analog
- Bandwidth
  - FSK: low bandwidth (in theory 2 frequencies sufficient)
  - FM: high bandwidth utilization
- Typical applications
  - FSK: high-reliability, low-bandwidth transmissions
  - FM: audio communication, radio broadcasting

**THANK YOU  
FOR YOUR  
ATTENTION**

**Are there any questions?**



# Sources

- <https://wiki.gnuradio.org> (29.11.2023)
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