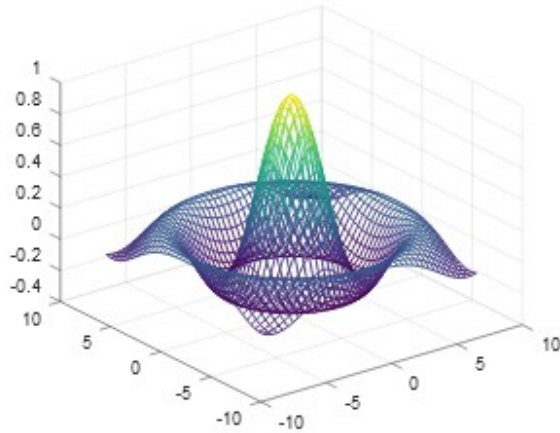


# Octave als Testfeld für Algorithmen

- 1) Installation und Benutzung von Octave
- 2) Tipps zum Konzept von Octave und zum Debugger
- 3) Unter codec2/octave befinden sich eine Menge von Octave-Funktionen und -Skripten
- 4) Wir starten mit „fdmdv\_ut.m“



## GNU Octave

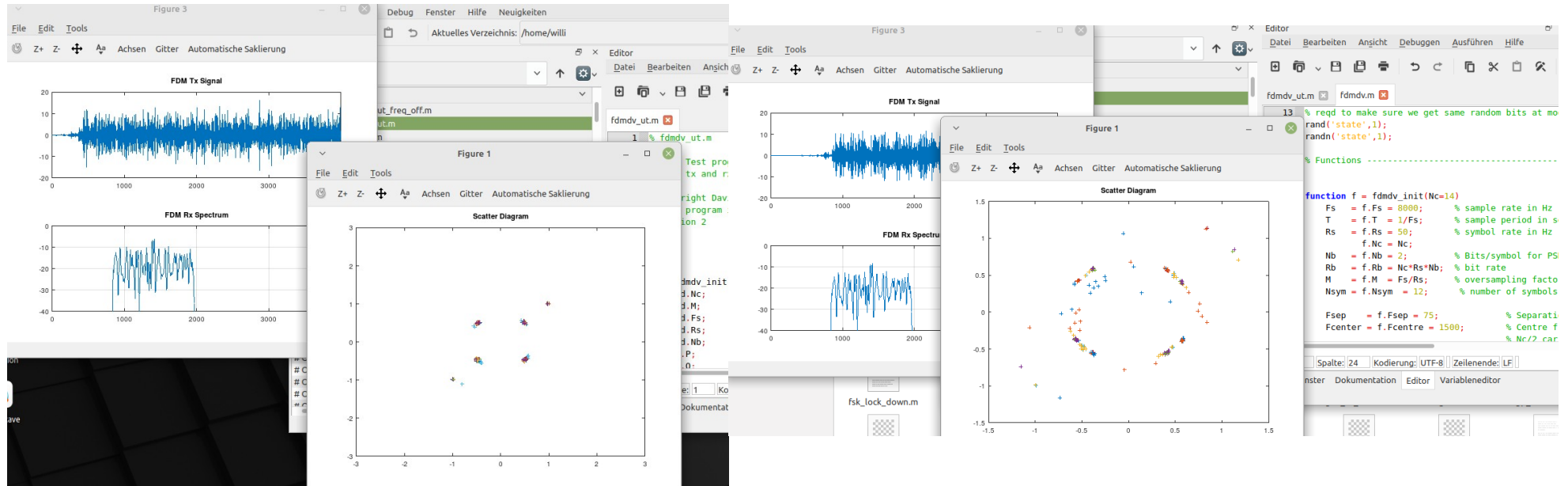
### Scientific Programming Language

- Powerful mathematics-oriented syntax with built-in 2D/3D plotting and visualization tools
- Free software, runs on GNU/Linux, macOS, BSD, and Microsoft Windows
- Drop-in compatible with many Matlab scripts

- <https://octave.org/download>
- `pkg list` listet alle verfügbaren Pakete auf (die werden mit installiert)
- <https://docs.octave.org/v6.4.0> ca. 1000-seitige Doku

# fdmdv\_ut.m (unit tests); fdmdv.m (FDM modem)

- Modifikation einzelner Parameter

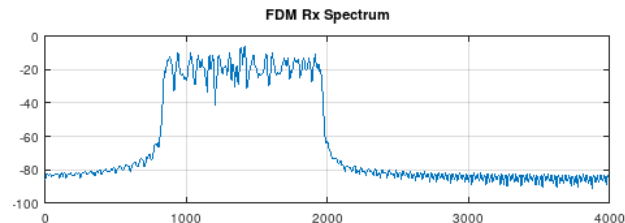
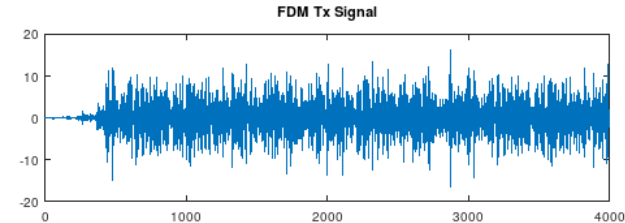
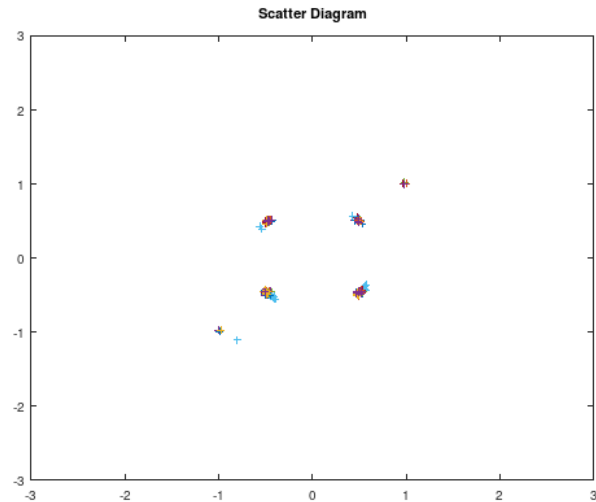


# fdmdv\_ut.m (unit tests)

```
22 % Simulation Parameters -----
23
24 % Short-ish run for ctest. For reg
25 frames = 25; #25
26 EbNo_dB = 100; #100
27 Foff_hz = -100; #-100
28 modulation = 'dqpsk'; #'dqpsk'
29 hpa_clip = 150; #150
30
31 % -----
32
```

```
>> fdmdv_ut

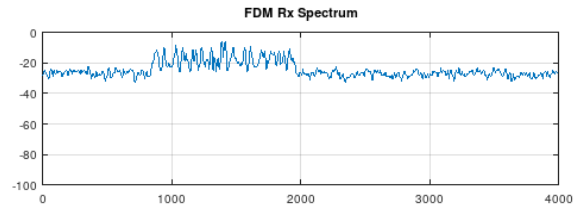
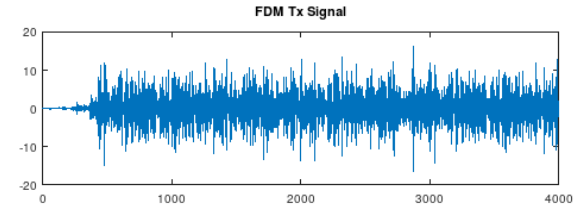
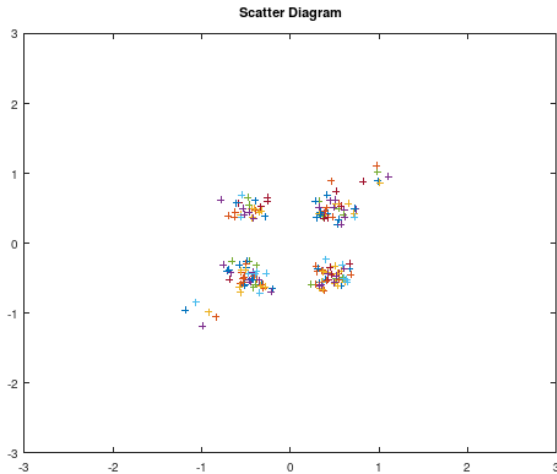
Bits/symbol.: 2
Num carriers: 14
Bit Rate....: 1400 bits/s
Eb/No (meas): 100.00 (101.03) dB
bits.....: 336
errors.....: 0
BER.....: 0.0000
PAPR.....: 12.26 dB
SNR...(meas): 96.69 (3.20) dB
>> |
```



# fdmdv\_ut.m (unit tests)

```
22 % Simulation Parameters -----
23
24 % Short-ish run for ctest. For r
25 frames = 25; #25
26 EbNo_dB = 10; #100
27 Foff_hz = -100; #-100
28 modulation = 'dqpsk'; #'dqpsk'
29 hpa_clip = 150; #150
30
31 % -----
--
```

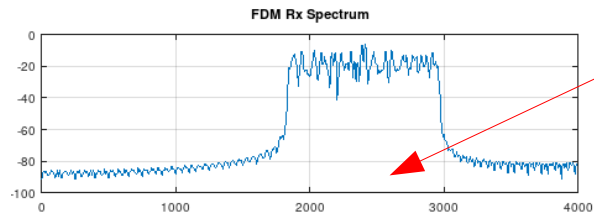
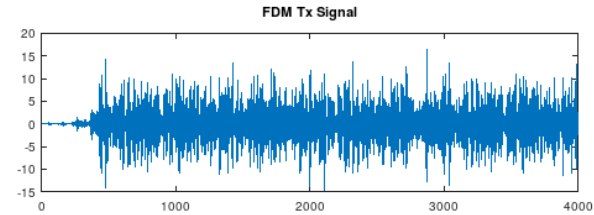
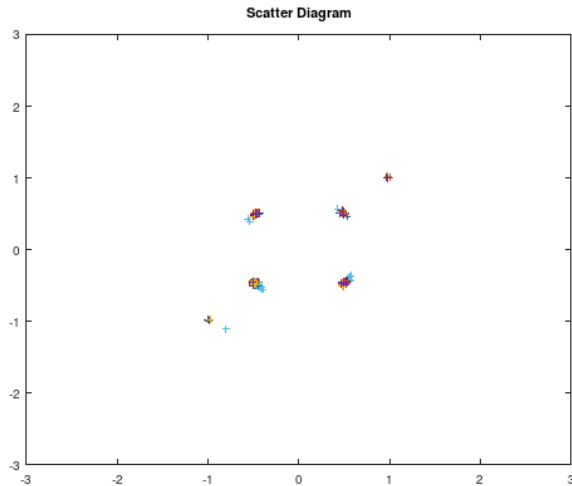
```
Bits/symbol.: 2
Num carriers: 14
Bit Rate....: 1400 bits/s
Eb/No (meas): 10.00 (11.03) dB
bits.....: 336
errors.....: 0
BER.....: 0.0000
PAPR.....: 12.26 dB
SNR...(meas): 6.69 (2.56) dB
>> |
```



# fdmdv (modem)

```
20 function f = fdmdv_init(Nc=14) #14
21     Fs = f.Fs = 8000; % sample rate in Hz
22     T = f.T = 1/Fs; % sample period in seconds
23     Rs = f.Rs = 50; % symbol rate in Hz
24     f.Nc = Nc;
25     Nb = f.Nb = 2; % Bits/symbol for PSK modulation
26     Rb = f.Rb = Nc*Rs*Nb; % bit rate
27     M = f.M = Fs/Rs; % oversampling factor
28     Nsym = f.Nsym = 6; #6 % number of symbols to filter o
29
30     Fsep = f.Fsep = 75; #75 % Separation between
31     Fcenter = f.Fcentre = 2500; #1500 % Centre frequency,
```

```
>> fdmdv_ut
Bits/symbol.: 2
Num carriers: 14
Bit Rate....: 1400 bits/s
Eb/No (meas): 100.00 (101.03) dB
bits.....: 336
errors.....: 0
BER.....: 0.0000
PAPR.....: 12.19 dB
SNR...(meas): 96.69 (3.20) dB
```



# fdmdv (modem)

```

20 function f = fdmdv_init(Nc=24) #14
21     Fs = f.Fs = 8000; % sample rate in Hz
22     T = f.T = 1/Fs; % sample period in seconds
23     Rs = f.Rs = 50; % symbol rate in Hz
24     f.Nc = Nc;
25     Nb = f.Nb = 2; % Bits/symbol for PSK modulation
26     Rb = f.Rb = Nc*Rs*Nb; % bit rate
27     M = f.M = Fs/Rs; % oversampling factor
28     Nsym = f.Nsym = 6; #6 % number of symbols to filter
29
30     Fsep = f.Fsep = 75; #75 % Separation between
31     Fcenter = f.Fcentre = 1500; #1500 % Centre frequency
    
```

```

>> fdmdv_ut

Bits/symbol.: 2
Num carriers: 24
Bit Rate....: 2400 bits/s
Eb/No (meas): 100.00 (100.57) dB
bits.....: 576
errors.....: 0
BER.....: 0.0000
PAPR.....: 15.44 dB
SNR...(meas): 99.03 (4.86) dB
    
```

