

Experiment 6 : ASK, PSK, QAM Waveforms

Experiment coded in MATLAB is given on course webpage with the names “Modwaveforms_Exp6.m” and “ModWaveforms_Exp6.mdl”.

1. Download both m and model files.
2. This experiment is intended to show signal waveforms $s_1(t) \dots s_M(t)$ of ASK, PSK and QAM against an M ary level input signal. Note that M ary level signal is randomly generated at each run
3. A sample exercise for PSK at $M = 4$ is shown below.
4. Repeat the same for all modulation types at $M = 4, 8$ and 16 .
5. Plot all relevant waveforms, graphs in your lab notebook.
6. Include your general comments

Sample exercise for PSK at $M = 4$.

After running the m file Modwaveforms_Exp6.m (when complex ModWaveforms_Exp6.mdl is open), we get the following sample output

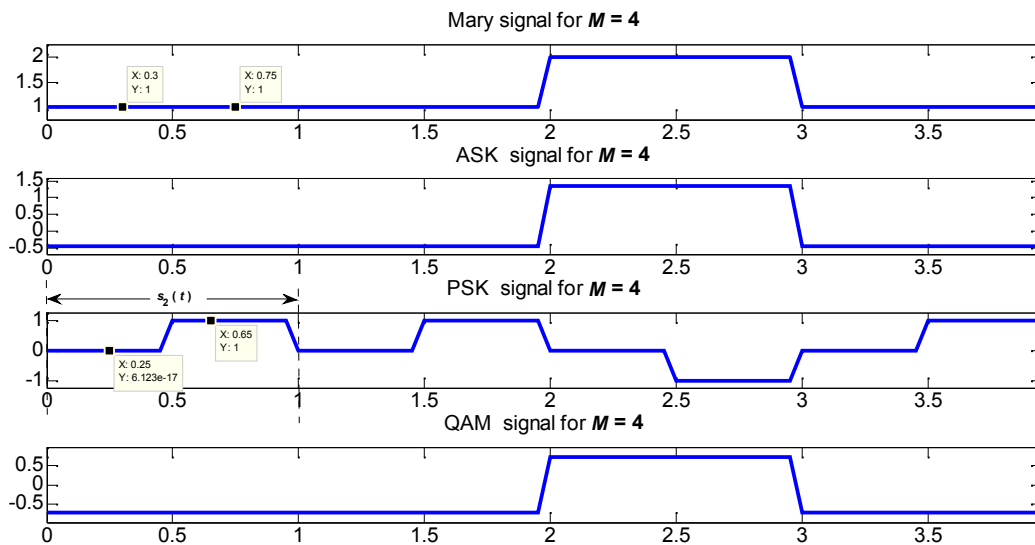


Fig. 1 Typical output obtained by running Modwaveforms_Exp6.m.

As from the first line of Fig. 1, in the time interval of the first M ary symbol, that is $0 \leq t \leq 1$, M ary level is 1. Note that M ary signal levels run in the range $0 \dots M - 1$. So M ary level of 1 would correspond to s_2 in our PSK constellation as shown in Fig. 2.

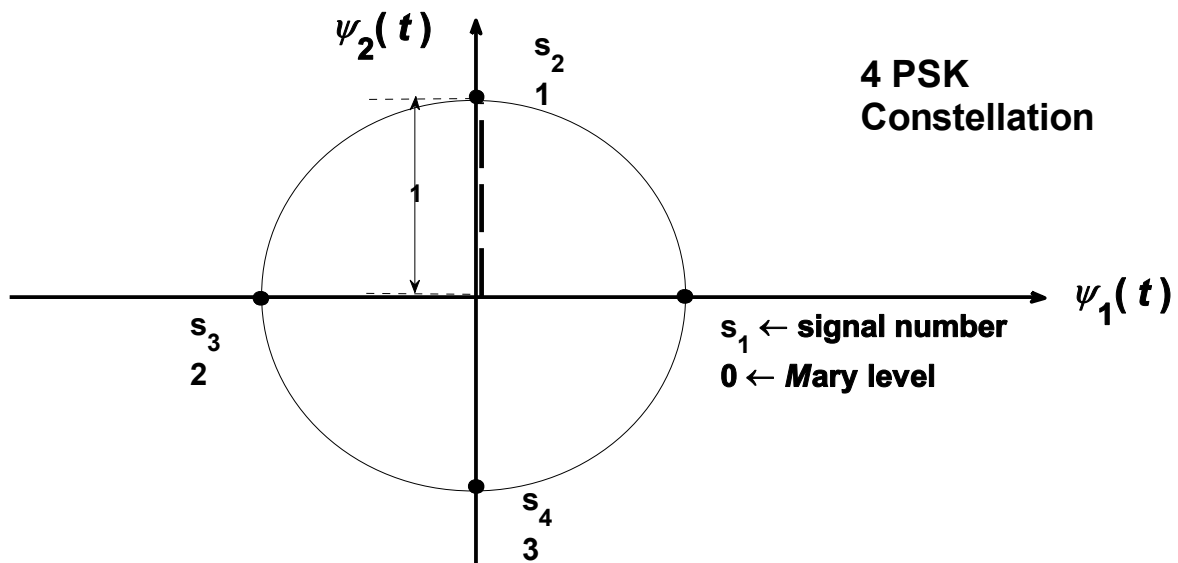


Fig. 2 4 PSK Constellation.

By selecting the orthonormalized basis functions of Fig. 3, we are able to confirm that the first selected symbol of PSK is indeed $s_2(t)$. Note that $\psi_1(t)$, $\psi_2(t)$ will be applicable to all M of PSK and QAM, but the basis function of ASK will be different. You are expected plot this as well..

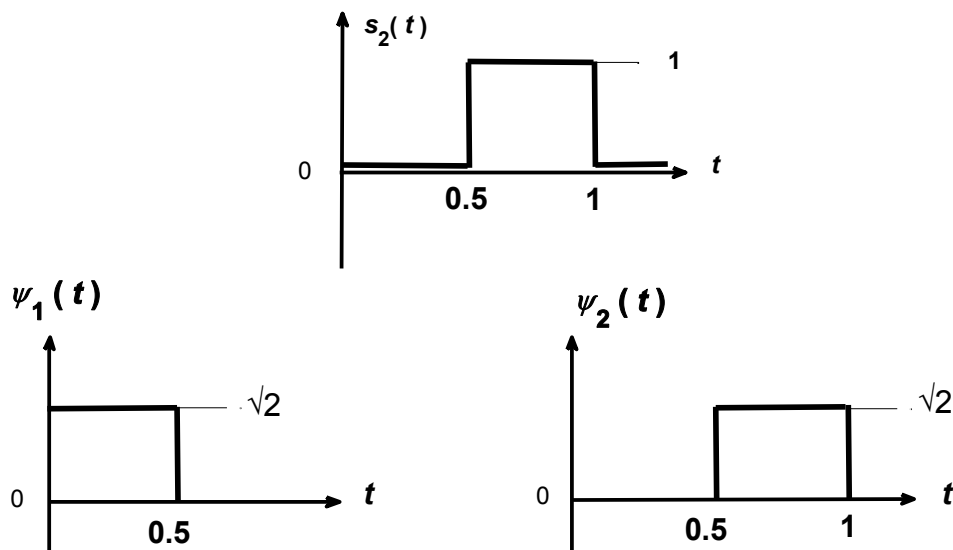


Fig 3. Plots of $s_2(t)$ and $\psi_1(t)$, $\psi_2(t)$.