Tsym = 1e-6;
bitsPerSymbol = 2;
M = 2.^bitsPerSymbol;
nPayload = 800;
nTrain = 200;
nTail = 30;

Figure 3 shows the response of frequency selective fading channel and linear equalizer.

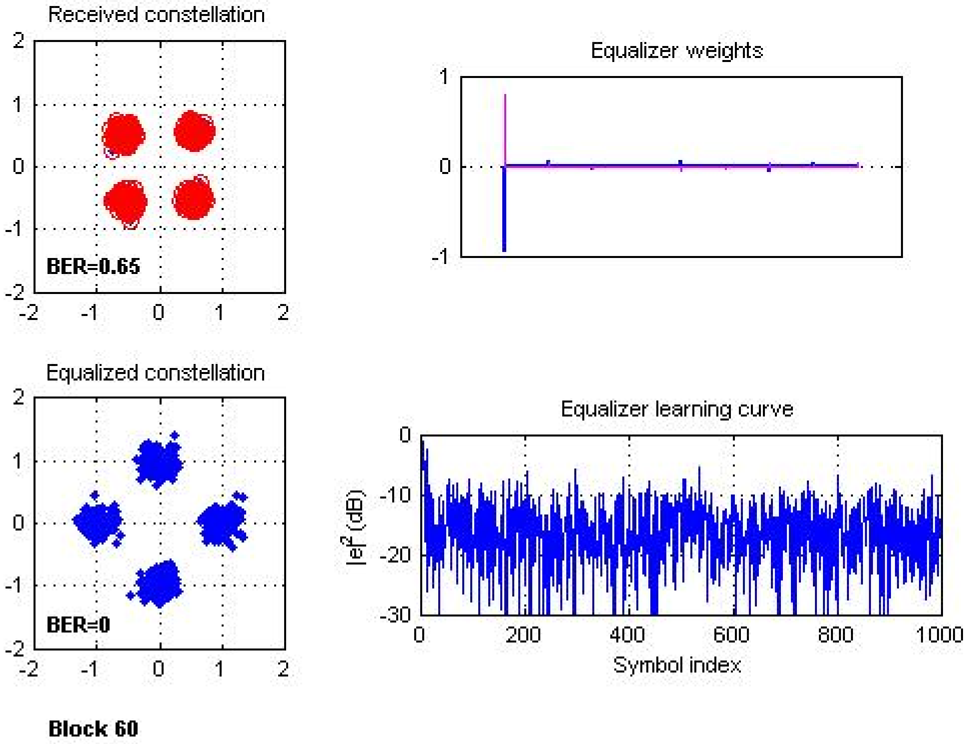

Figure 3: Response of Frequency-Selective Fading Channel and Linear Equalizer

Output of MATLAB

eqObj =

EqType: 'Linear Equalizer'
AlgType: 'RLS'
nWeights: 9
nSampPerSym: 1
RefTap: 9
SigConst: [1x4 double]
ForgetFactor: 0.9900
InvCorrInit: 0.1000
InvCorrMatrix: [9x9 double]
Weights: [0 0 0 0 0 0 0 0 0] WeightInputs: [0 0 0 0 0 0 0 0 0]
ResetBeforeFiltering: 1
NumSamplesProcessed: 0

avgBER2 = 0.0131

3.3 Adaptive Equalizer

The receiver uses a adaptive equalizer with a six-tap fractionally spaced forward filter (two samples per symbol) and two feedback weights. The DFE uses the same RLS algorithm as in 3.2. The receive filter structure is reconstructed to account for the increased number of samples per symbol. This simulation uses the same channel object as in 3.2. Adaptive equalization parameters are:

- Number of feed-forward equalizer weights =9
- Number of feedback filter weights = 2

Figure 4 shows the response of adaptive equalizer.

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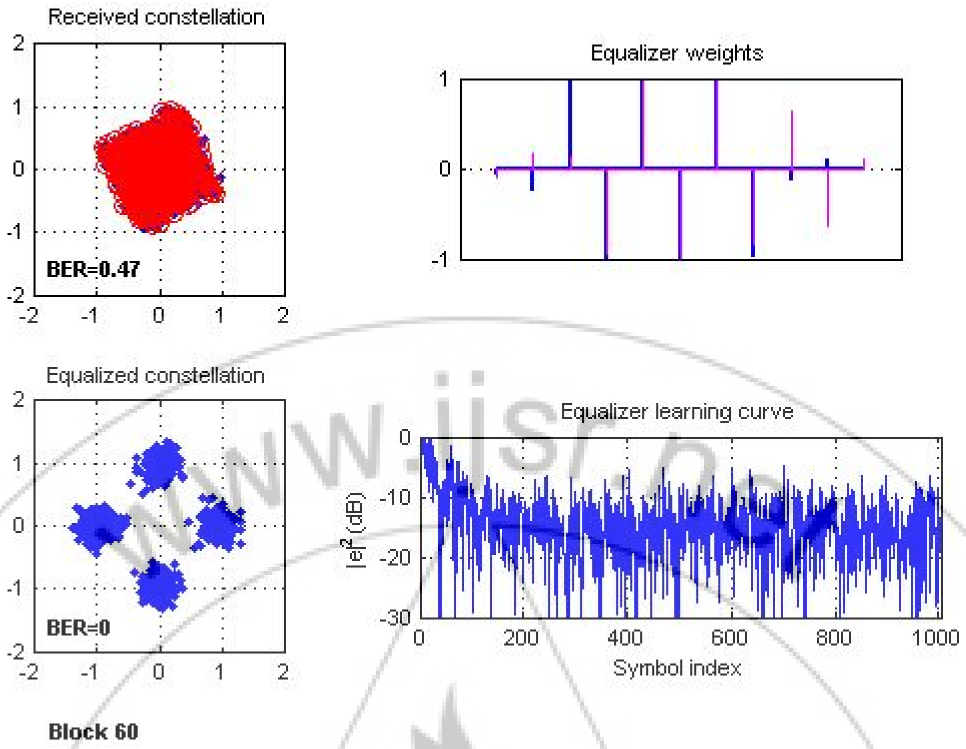

Figure 4: Response of Decision Feedback Equalizer (DFE)

eqObj =

EqType: 'Decision Feedback Equalizer'
AlgType: 'RLS'
nWeights: [9 2]
nSampPerSym: 2
RefTap: 9
SigConst: [1x4 double]
ForgetFactor: 0.9900
InvCorrInit: 0.1000
InvCorrMatrix: [11x11 double]
Weights: [0 0 0 0 0 0 0 0 0 0 0]
WeightInputs: [0 0 0 0 0 0 0 0 0 0 0]
ResetBeforeFiltering: 1
NumSamplesProcessed: 0
avgBER3 = 1.9792e-004

4. Conclusion

It is evident that the received filter structure for Decision Feedback Equalization is re-organized to account for the augmented number of samples per symbol with the equivalent channel entity as in linear equalization. Consequently, it can be concluded that the equalization using Decision Feedback Equalizing enhances the competence of the communication system.

5. Future Scope

In future the purposed work may be implemented on FPGA platform for more realistic, economically viable and efficient results which may alter the current scenario of expensive communication systems drastically by reducing its cost.

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