Claims

1. A method for selecting transmission parameters for a data transmission comprising

determining, for each of a plurality of transmission parameter settings, a data throughput that is expected when the transmission parameter setting is used for data transmission, wherein the data throughput is determined using a pre-generated mapping of transmission parameter settings to data throughput; and

selecting a transmission parameter setting based on the determined data throughput.

2. The method according to claim 1, wherein the transmission parameter setting is selected such that the expected throughput is maximized.

3. The method according to claim 1, wherein the data throughput is determined from an error rate that is expected when the transmission parameter setting is used for data transmission.

4. The method according to claim 3, wherein the error rate is determined using a pre-generated mapping of transmission parameter settings to error rates.

5. The method according to claim 1, wherein the transmission parameter setting is selected subject to a target error rate constraint of the data transmission.

6. The method according to claim 5, wherein the target error rate constraint is obtained from a Quality of Service constraint of the data transmission.

7. The method according to claim 1, further comprising carrying out the data transmission using the selected transmission parameter setting.

8. The method according to claim 1, wherein the transmission parameter setting defines at least one of a data transmission mode, a coding rate, a constellation size, a modulation type, and a coding type.

9. The method according to claim 3, wherein the expected error rate for a transmission parameter setting is an expected packet error rate for the transmission parameter setting.

10. The method according to claim 4, wherein the pre-generated mapping of transmission parameter settings to error rates is pre-generated based on an analysis of extrinsic information transfer in a receiver receiving data according to the respective transmission parameter settings.

11. The method according to claim 4, wherein the pre-generated mapping of transmission parameter settings to error rates is pre-generated by simulation.

12. The method according to claim 5, where the target error rate constraint is a limit of the probability that the actual error rate exceeds a pre-specified target error rate.

13. The method according to claim 11, wherein the pre-generated mapping of transmission parameter settings to error rates is implemented by using a look up table pre-generated from the simulation results.

14. The method according to claim 11, wherein the pre-generated mapping of transmission parameter settings to error rates is pre-generated from the simulation results by curve-fitting.

15. The method according to claim 14, wherein the curve-fitting function is a polynomial.

16. The method according to claim 14, wherein different curve fitting functions are used for different transmission parameter settings.

17. The method according to claim 14, wherein different curve fitting functions are used for different signal-to-noise ratio regions for the same transmission parameter setting.

18. The method according to claim 1, wherein the data transmission is a data transmission in a radio communication system.

19. The method according to claim 18, wherein the communication system is a multiple-input multiple-output communication system.

20.The method according to claim 16, wherein the communication system is a multiple-input multiple-output system using orthogonal frequency division multiplexing.

21. The method according to claim 1, wherein the transmission parameter setting specifies a number of spatial streams to be selected for the data transmission and the transmission parameter setting is selected based on a previously selected

transmission parameter setting and a pre-determined switching table associated with the previously selected transmission parameter setting, wherein the switching table includes information about characteristics of the data transmission when a different number of spatial streams is used than according to the previously selected transmission parameter setting.

22. The method according to claim 21, wherein the characteristics of the data transmission is the robustness of the data transmission or the expected throughput of the data transmission.

23. The method according to claim 1, wherein the transmission parameter setting is selected from a set of candidate transmission parameter settings generated based on a look-up table which is generated based on at least one of a transmission parameter setting used for the transmission of a received data packet, the signal-to-noise ratio of a communication channel via which a data packet has been received, the number of transmit antennas and receive antennas used for the data transmission, and the capability of the transmitter and the receiver involved in the data transmission.

24. The method according to claim 1, wherein the pre-determined mapping function uses a post-detection signal-to-noise ratio as input.

25. The method according to claim 24, wherein a plurality of spatial streams are used for the data transmission and the determination of the post-detection signal-to-noise ratio

comprises at least one of grouping, sorting or averaging the signal-to-noise ratios of the spatial streams.

26. The method according to claim 24, wherein a plurality of transmit antennas and a plurality of receive antennas are used for the data transmission and wherein, if the number of transmit antennas is different from the number of receive antennas, a signal-to-noise ratio offset is used for determining the post-detection signal-to-noise ratio.

27. A data transmission controller comprising
a determining circuit configured to determine, for each of a plurality of transmission parameter settings, a data throughput that is expected when the transmission parameter setting is used for a data transmission, wherein the data throughput is determined using a pre-generated mapping of transmission parameter settings to data throughputs; and
a selecting circuit configured to select a transmission parameter setting based on the determined data throughput.

28. The data transmission controller according to claim 27, being part of a communication device.

29. The data transmission controller according to claim 28, the communication device being part of a radio communication system.

30. The data transmission controller according to claim 28, further comprising a transmitter transmitting data according to the selected transmission parameter setting or signaling the selected transmission parameter setting to a communication device as transmission parameter setting to be used for a data transmission by the communication device.

31. A computer program product, which, when executed by a computer, makes the computer perform a method for selecting transmission parameters for a data transmission comprising determining, for each of a plurality of transmission parameter settings, a data throughput that is expected when the transmission parameter setting is used for data transmission, wherein the data throughput is determined using a pre-generated mapping of transmission parameter settings to data throughputs; and selecting a transmission parameter setting based on the determined data throughput.

32. A method for estimating the signal-to-noise ratio of a communication channel, comprising
determining an offset value based on a first value which characterizes a noise power and filter coefficients which characterize a filter for filtering received data signals;
determining a second value characterizing the signal-to-noise ratio using the offset value.

33. The method according to claim 32, wherein the signal-to-noise ratio is estimated according to

$$\gamma = 10\log\frac{a^2}{a + \sigma_e^2 \underline{w}^H \underline{w} - a^2}$$

wherein
$\underline{w}$ is a vector of filter coefficients;
σ_e^2 characterizes the noise power; and
a is determined based on the filter coefficients and transmission characteristics of the communication channel.

Claims

1. A method for selecting transmission parameters for a data transmission comprising:

determining (201), for each of a plurality of transmission parameter settings, a data throughput that is expected when the transmission parameter setting is used for data transmission, wherein the data throughput is determined using a pre-generated mapping of transmission parameter settings to data throughput and wherein data throughput is determined from an error rate that is expected when the transmission parameter setting is used for data transmission; and

selecting (202) a transmission parameter setting based on the determined data throughput such that the expected data throughput is maximized subject to a target error rate constraint of the data transmission, which is obtained from a Quality of Service constraint of the data transmission,

wherein the transmission parameter setting specifies a number of spatial streams to be selected for the data transmission and the transmission parameter setting is selected based on a previously selected transmission parameter setting and a pre-determined switching table associated with the previously selected transmission parameter setting, wherein the switching table includes information about characteristics of the data transmission when a different number of spatial streams is used than according to the previously selected transmission parameter setting, and wherein the characteristics of the data transmission is the robustness of the data transmission or the expected throughput of the data transmission.

2. The method according to claim 1, wherein the error rate is determined using a pre-generated mapping of transmission parameter settings to error rates.

3. The method according to claim 1, wherein the transmission parameter setting is selected (202) subject to a target error rate constraint of the data transmission,
wherein the target error rate constraint is preferably obtained from a Quality of Service constraint of the data transmission.

4. The method according to claim 1, further comprising carrying out the data transmission using the selected transmission parameter setting, or
wherein the transmission parameter setting defines at least one of a data transmission mode, a coding rate, a constellation size, a modulation type, and a coding type.

5. The method according to claim 2, wherein the pre-generated mapping of transmission parameter settings to error rates is pre-generated based on an analysis of extrinsic information transfer in a receiver receiving data according to the respective transmission parameter settings.

6. The method according to claim 2, wherein the pre-generated mapping of transmission parameter settings to error rates is pre-generated by simulation, wherein the pre-generated mapping of transmission parameter settings to error rates is preferably pre-generated from the simulation results by curve-fitting, wherein preferably different curve fitting functions are used for different signal-to-noise ratio regions for the same transmission parameter setting.

7. The method according to claim 1, wherein the transmission parameter setting is selected (202) from a set of candidate transmission parameter settings generated based on a look-up table which is generated based on at least one of a transmission parameter setting used for the transmission of a received data packet, the signal-to-noise ratio of a communication channel via which a data packet has been received, the number of transmit antennas and receive antennas used for the data transmission, and the capability of the transmitter and the receiver involved in the data transmission.

8. The method according to claim 1, wherein the pre-determined mapping function uses a post-detection signal-to-noise ratio as input,
wherein preferably a plurality of spatial streams are used for the data transmission and the determination of the post-detection signal-to-noise ratio comprises at least one of grouping, sorting or averaging the signal-to-noise ratios of the spatial streams.

9. The method according to claim 8, wherein preferably a plurality of transmit antennas and a plurality of receive antennas are used for the data transmission and wherein, if the number of transmit antennas is different from the number of receive antennas, a signal-to-noise ratio offset is used for determining the post-detection signal-to-noise ratio.

10. A data transmission controller (300) comprising a determining circuit (301) configured to determine, for each of a plurality of transmission parameter settings, a data throughput that is expected when the transmission parameter setting is used for a data transmission, wherein the data

throughput is determined using a pre-generated mapping of transmission parameter settings to data throughputs and wherein data throughput is determined from an error rate that is expected when the transmission parameter setting is used for data transmission; and

a selecting circuit (302) configured to select a transmission parameter setting based on the determined data throughput such that the expected data throughput is maximized subject to a target error rate constraint of the data transmission, which is obtained from a Quality of Service constraint of the data transmission, wherein the transmission parameter setting specifies a number of spatial streams to be selected for the data transmission and the transmission parameter setting is selected based on a previously selected transmission parameter setting and a pre-determined switching table associated with the previously selected transmission parameter setting, wherein the switching table includes information about characteristics of the data transmission when a different number of spatial streams is used than according to the previously selected transmission parameter setting, and wherein the characteristics of the data transmission is the robustness of the data transmission or the expected throughput of the data transmission.

11. A computer program product, which, when executed by a computer, makes the computer perform a method for selecting transmission parameters for a data transmission comprising determining (201), for each of a plurality of transmission parameter settings, a data throughput that is expected when the transmission parameter setting is used for data transmission, wherein the data throughput is determined using a pre-generated mapping of transmission parameter settings to data throughputs and wherein data throughput is determined

from an error rate that is expected when the transmission parameter setting is used for data transmission; and

selecting (202) a transmission parameter setting based on the determined data throughput such that the expected data throughput is maximized subject to a target error rate constraint of the data transmission, which is obtained from a Quality of Service constraint of the data transmission, wherein the transmission parameter setting specifies a number of spatial streams to be selected for the data transmission and the transmission parameter setting is selected based on a previously selected transmission parameter setting and a pre-determined switching table associated with the previously selected transmission parameter setting, wherein the switching table includes information about characteristics of the data transmission when a different number of spatial streams is used than according to the previously selected transmission parameter setting, and wherein the characteristics of the data transmission is the robustness of the data transmission or the expected throughput of the data transmission.