

CLAIMS

1. A method of wireless communications, comprising: splitting a Downlink Control Information (DCI) into a first stage and a second stage, the first stage and the second stage being configured to schedule uplink resources for an uplink data channel or downlink resources for a downlink data channel; generating multiple control resource blocks (CRBs) for a control channel, each CRB of the multiple CRBs having a reference signal (RS) and data resource elements (REs), each CRB of the multiple CRBs having a first orthogonal frequency-division multiple (OFDM) symbol and a second OFDM symbol, wherein the second OFDM symbol is after the first OFDM symbol in a time domain, the multiple CRBs being configured to support a dual-stage delivery of the DCI by having the first stage of the DCI in the first OFDM symbol and the second stage of the DCI in the second OFDM symbol, the first stage of the DCI including information that does not depend on a previous physical uplink control channel (PUCCH) feedback, and the second stage of the DCI including information that depends on the previous PUCCH feedback; and precoding the multiple CRBs such that the RS and the data REs within each CRB of the multiple CRBs are precoded in a same fashion.
2. The method of claim 1, wherein a same beamforming is used for precoding each CRB of the multiple CRBs.
3. The method of claim 1, wherein each CRB of the multiple CRBs is independently precoded.
4. The method of claim 1, wherein the multiple CRBs are localized or distributed.
5. The method of claim 1, wherein the first stage of the DCI is in data REs in the first OFDM symbol and the second stage of the DCI is in data REs in the second OFDM symbol.
6. The method of claim 1, wherein each CRB of the multiple CRBs includes a continuous set of tones for the control channel over one or more OFDM symbols.
7. The method of claim 1, wherein a same beamforming is used for precoding across the multiple CRBs.
8. The method of claim 1, wherein the control channel is a physical downlink control channel (PDCCH).
9. An apparatus for wireless communications, comprising: a transceiver; a memory storing instructions; and a processor communicatively coupled to the transceiver and the memory, the processor being configured to execute the instructions to: split a Downlink Control Information (DCI) into a first stage and a second stage, the first stage and the second stage being configured to schedule uplink resources for an uplink data channel or downlink resources for a downlink data channel; generate multiple control resource blocks (CRBs) for a control channel, each CRB

of the multiple CRBs having a reference signal (RS) and data resource elements (REs), each CRB of the multiple CRBs having a first orthogonal frequency-division multiple (OFDM) symbol and a second OFDM symbol, wherein the second OFDM symbol is after the first OFDM symbol in a time domain, the multiple CRBs being configured to support a dual-stage delivery of the DCI by having the first stage of the DCI in the first OFDM symbol and the second stage of the DCI in the second OFDM symbol, the first stage of the DCI including information that does not depend on a previous physical uplink control channel (PUCCH) feedback, and the second stage of the DCI including information that depends on the previous PUCCH feedback; and precode the multiple CRBs such that the RS and the data REs within each CRB of the multiple CRBs are precoded in a same fashion.

10. The apparatus of claim 9, wherein a same beamforming is used for precoding each CRB of the multiple CRBs.

11. The apparatus of claim 9, wherein each CRB of the multiple CRBs is independently precoded.

12. The apparatus of claim 9, wherein the multiple CRBs are localized or distributed.

13. The apparatus of claim 9, wherein each CRB of the multiple CRBs includes a continuous set of tones for the control channel over one or more OFDM symbols.

14. The apparatus of claim 9, wherein the control channel is a physical downlink control channel (PDCCH).

15. An apparatus of wireless communications, comprising: means for splitting a Downlink Control Information (DCI) into a first stage and a second stage, the first stage and the second stage being configured to schedule uplink resources for an uplink data channel or downlink resources for a downlink data channel; means for generating multiple control resource blocks (CRBs) for a control channel, each CRB of the multiple CRBs having a reference signal (RS) and data resource elements (REs), each CRB of the multiple CRBs having a first orthogonal frequency-division multiple (OFDM) symbol and a second OFDM symbol, wherein the second OFDM symbol is after the first OFDM symbol in a time domain, the multiple CRBs being configured to support a dual-stage delivery of the DCI by having the first stage of the DCI in the first OFDM symbol and the second stage of the DCI in the second OFDM symbol, the first stage of the DCI including information that does not depend on a previous physical uplink control channel (PUCCH) feedback, and the second stage of the DCI including information that depends on the previous PUCCH feedback; and means precoding the multiple CRBs such that the RS and the data REs within each CRB of the multiple CRBs are precoded in a same fashion.

16. The apparatus of claim 15, wherein a same beamforming is used for precoding each CRB of the multiple CRBs.

17. The apparatus of claim 15, wherein each CRB of the multiple CRBs is independently precoded.

18. The apparatus of claim 15, wherein the multiple CRBs are localized or distributed.

19. The apparatus of claim 15, wherein the control channel is a physical downlink control channel (PDCCH).

20. A non-transitory computer-readable storage medium that stores computer-executable codes for wireless communications, comprising: code for splitting a Downlink Control Information (DCI) into a first stage and a second stage, the first stage and the second stage being configured to schedule uplink resources for an uplink data channel or downlink resources for a downlink data channel; code for generating multiple control resource blocks (CRBs) for a control channel, each CRB of the multiple CRBs having a reference signal (RS) and data resource elements (REs), each CRB of the multiple CRBs having a first orthogonal frequency-division multiple (OFDM) symbol and a second OFDM symbol, wherein the second OFDM symbol is after the first OFDM symbol in a time domain, the multiple CRBs being configured to support a dual-stage delivery of the DCI by having the first stage of the DCI in the first OFDM symbol and the second stage of the DCI in the second OFDM symbol, the first stage of the DCI including information that does not depend on a previous physical uplink control channel (PUCCH) feedback, and the second stage of the DCI including information that depends on the previous PUCCH feedback; and code precoding the multiple CRBs such that the RS and the data REs within each CRB of the multiple CRBs are precoded in a same fashion.