requests are increased, then throughput, which is amount of data being transmitted in a predetermined period, may be decreased. To solve the problem, the ARQ can be used along with a forward error correction coding (FEC) method, which is called as a hybrid ARQ.

[0028] The hybrid ARQ has three types I, II and III.

[0029] In case of type I, one coding rate is selected, for example, a coding rate is either no coding, rate ½ or rate ⅓ of convolutional coding, which is chosen according to channel environment or required quality of service (QoS), and the selected coding rate is continuously used. If there is a re-transmit request, the receiver removes pre-received data, and the transmitter re-transmits the data at the pre-transmitted coding rate. In this case, the coding rate is not changed according to changing channel environment, so, when compared with the type II and III the throughput may be decreased.

[0030] In case of type II ARQ, if the receiver requests data re-transmission, then the first received data is stored onto a buffer and the stored data is combined with the retransmitted data. That is, at first, the data is transmitted with a high coding rate, and in case of re-transmitting, the data is transmitted with a low coding rate and combined with the pre-received stored data to increase efficiency. For example, a convolutional coding rate ¼, which is a mother code, may generate coding rates ⅘, ⅔ or ¼ by puncturing and it is called a rate compatible punctured convolutional (RCPC) code. The RCPC code is illustrated **FIG. 1**.

[0031] A rate compatible punctured turbo (RCPT) code is obtained by puncturing a turbo code. Referring to **FIG. 1**, at first, data is transmitted with a coding rate of ⅘, and the original received version of the data is called ver(0), an error is detected in the data by checking a cyclic redundancy check (CRC) and the data is stored to a buffer, and retransmission is requested. The re-transmission is performed with a coding rate ⅔, and the re-transmission version is called ver(1).

[0032] The receiver combines the ver(0) data stored in the buffer and the ver(1) data. The combined data is decoded and checked by the CRC. The above-referenced process is repeated until an error is not detected. The last transmitted ver(n) is combined with a pre-transmitted ver(n−a)(0<a<n).

[0033] The type III ARQ is similar to the type II ARQ. It is different in that the re-transmitted ver(n) data is decoded before being combined with the ver(n−a) data, and checked by the CRC. If there is no error, the ver(n) data is transmitted to an upper layer. If an error is detected, the re-transmitted ver(n) data is combined with ver(n−a) and checked by the CRC to determine if further data re-transmission is necessary.

[0034] Accordingly, the hybrid ARQ type II/III is used for efficienct data transmission in the UTRAN.

[0035] The hybrid ARQ type II/III combines a first data which is encoded with a high coding rate, and a re-transmit data which is encoded with a low coding rate in the receiver to increase the throughput. Therefore, relational information between a sequence number and a re-transmitted version of a protocol data unit (PDU) is needed to be known in advance. The relation information should be transmitted with a low coding rate regardless of the re-transmission coding rate, thereby ensuring its quality of communication.

[0036] However, for the hybrid ARQ type II/III in the UTRAN, the data is transmitted with the high coding rate, thereby increasing the possibility of an error of a header of a RLC-PDU is increasing. Therefore, a method of stably transmitting the RLC-PDU header is required.

SUMMARY OF THE INVENTION

[0037] It is, therefore, an object of the present invention to provide a data delivery method for hybrid ARQ type II/III on the downlink of wide-band radio communication system and a recording media for reading instructions for the method using a computer.

[0038] In accordance with an aspect of the present invention, there is provided a data processing method for a hybrid ARQ type II/III on a downlink of a wide-band radio communication system, wherein a serving radio network controller (hereinafter, referred to as a SRNC) which is directly connected to a user equipment to allocate wireless resources to the user equipment and provides services by interlocking with a wireless communication core network in case of a call connection and a controlling radio network controller (hereinafter, referred to as a CRNC) which controls a shared channel of a radio network, are located on different radio networks, comprising the steps of: a) generating a radio link control—protocol data unit (hereinafter, referred to as a RLC-PDU) in a radio link control (hereinafter, referred to as a RLC) layer of the SRNC, and generating a part having RLC-PDU information needed for supporting the hybrid ARQ type II/III based on a header of the RLC-PDU (hereinafter, referred to as a HARQ-RLC-Control-PDU); b) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU to a medium access control dedicated (hereinafter, referred to as a MAC-D), which treats a general user part of a MAC layer through a logical channel; c) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU from the MAC-D of the SRNC to a medium access control common/shared (hereinafter, referred to as a MAC-C/SH), which treats common/shared channel part on the MAC layer of the CRNC; d) transforming the RLC-PDU and the HARQ-RLC-Control-PDU in the MAC-C/SH of the CRNC to a transmission block and transmitting it to a physical layer of a base station through a transport channel; and e) processing the transmission block to a radio transmission form in the physical layer of the base station and transmitting it from the base station through the physical layer.

[0039] Also, the present invention may further comprising the step of: f) storing the RLC-PDU to a buffer, extracting the RLC-PDU stored in the buffer by using the HARQ-RLC-Control-PDU, decoding the extracted RLC-PDU and transmitting the RLC-PDU to an upper layer, then transmitting a response to the radio network.

[0040] In accordance with another aspect of the present invention, there is provided a computer readable data recording media for a hybrid ARQ type II/III on a downlink of a wide-band radio communication system, wherein a serving radio network controller (hereinafter, referred to as a SRNC) which is directly connected to a user equipment to allocate wireless resources to the user equipment and provides services by interlocking with a wireless communication core network in case of a call connection and a controlling radio