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| Re: | IEEE P802.16-2004/Cor1/D4 (2005-08-07) |
| Abstract | The current CTC interleaver definition in Section 8.4.9.2.3.2 is ambiguous. This contribution provides text for the clarification. |
| Purpose | To clarify CTC channel coding interleaver definition. |
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# Clarification of CTC Interleaver Definition

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## Current Definition

The following is the CTC interleaver definition after combining the related text in two documents: IEEE Std 802.16-2004 and IEEE P802.16-2004/Cor1-D1 (2005-02-11).

*The interleaver requires the parameters P0, P1, P2 and P3, shown in Table 326.*

***Step 1: Switch alternate couples***

*For j = 0 … N-1*

*if ( j mod 2 == 1) let (B,A) = (A,B) (i.e., switch the couple)*

***Step 2: $P_i(j)$***

*The function $P_i(j)$ provides the interleaved address i of the consider couple j (i.e. interleavedVec(j) = OriginalVec ($P_i(j)$) ).*

*For j = 0 … N-1*

*Switch j mod 4:*

*Case 0: $i = (P_0 \bullet j + 1) \bmod N$*

*Case 1: $i = (P_0 \bullet j + 1 + N/2 + P_1) \bmod N$*

*Case 2: $i = (P_0 \bullet j + 1 + P_2) \bmod N$*

*Case 3: $i = (P_0 \bullet j + 1 + N/2 + P_3) \bmod N$*

## Clarification

In step2, the variable ‘i=P(j)’ is the address of the original vector (couple switched) for the j-th symbol of the interleaved vector. However, it is not clearly written in the spec.

## Proposed Modification

### 8.4.9.2.3.2 CTC interleaver

***[Change the text as follows]***

*The interleaver requires the parameters $P_0$, $P_1$, $P_2$ and ~~$P_3$~~, shown in Table 326.*

***Step 1: Switch alternate couples***

*Let the sequence $u_0=[(A_0, B_0), (A_1, B_1), (A_2, B_2), (A_3, B_3) \ldots, (A_{N-1}, B_{N-1})]$ be the input to first encoding $C_1$.*

*For ~~j~~ i= 0 … N-1*

*if (~~j~~ i mod 2 ==~~0~~ 1) let (~~B~~$A_i$,~~A~~$B_i$) ~~=~~ (~~A~~$B_i$,~~B~~$A_i$) (i.e., switch the couple)*

*This step gives a sequence $u_1=[(A_0, B_0), (B_1, A_1), (A_2, B_2), (B_3, A_3) \ldots, (B_{N-1}, A_{N-1})]=[u_1(0), u_1(1), u_1(2), u_1(3) \ldots, u_1(N-1)]$.*

***Step 2: $P_i(j)$***

*The function $P_i(j)$ provides ~~the interleaved address i of the consider couple j~~ the address of the couple of the sequence $u_1$ that shall be mapped onto the address j of the interleaved sequence (i.e. ~~interleavedVec~~ $u_2(j)$ = ~~OriginalVec~~ $u_1(P_i(j))$ ).*

*For j = 0 … N-1*

*Switch j mod 4:*

*Case 0: P(j)~~i~~ = ($P_0$ • j + 1) mod N*

*Case 1: P(j)~~i~~ = ($P_0$ • j + 1 + N/2 + $P_1$) mod N*

*Case 2: P(j)~~i~~ = ($P_0$ • j + 1 + $P_2$) mod N*

*Case 3: P(j)~~i~~ = ($P_0$ • j + 1 + N/2 + $P_3$) mod N*

*This step gives a sequence $u_2=[u_1(P(0)), u_1(P(1)), u_1(P(2)), u_1(P(3)) \ldots, u_1(P(N-1))]= [(B_{P(0)}, A_{P(0)}), (A_{P(1)}, B_{P(1)}), (B_{P(2)}, A_{P(2)}), (A_{P(3)}, B_{P(3)}), \ldots, (A_{P(N-1)}, B_{P(N-1)})]$. Sequence $u_2$ is the input to second encoding $C_2$.*