



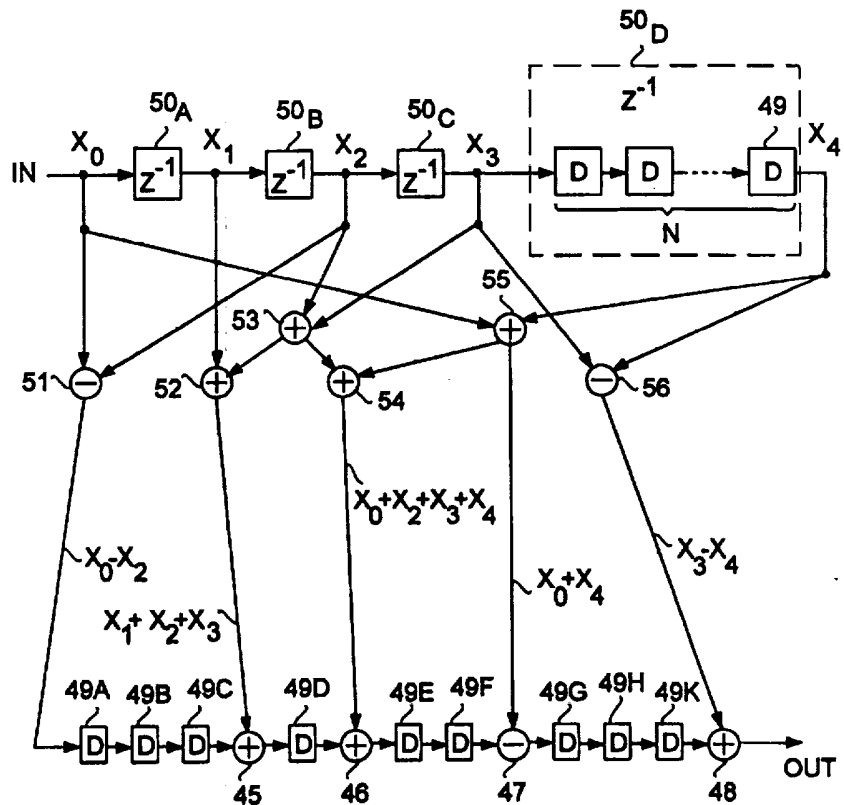
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : H03H 17/06</p>	<p>A3</p>	<p>(11) International Publication Number: WO 95/17708 (43) International Publication Date: 29 June 1995 (29.06.95)</p>
<p>(21) International Application Number: PCT/FI94/00568 (22) International Filing Date: 16 December 1994 (16.12.94) (30) Priority Data: 935709 17 December 1993 (17.12.93) FI (71)(72) Applicants and Inventors: PAJARRE, Eero [FI/FI]; Kanjoninkatu 11 C 26, FIN-33720 Tampere (FI). EEROLA, Ville [FI/FI]; Tohlopinkatu 15 A 2, FIN-33310 Tampere (FI). SARAMÄKI, Tapio [FI/FI]; Kreetarinkuja 4 A, FIN-33950 Pirkkala (FI). RITONIEMI, Tapani [FI/FI]; Insinöörinkatu 84 B 31, FIN-33720 Tampere (FI). HUSU, Timo [FI/FI]; Kirkkokatu 12 B 23, FIN-80110 Joensuu (FI). INGALSUO, Seppo [FI/FI]; Orivedenkatu 8 C 66, FIN-33720 Tampere (FI). (74) Agent: OY KOLSTER AB; Iso Roobertinkatu 23, P.O. Box 148, FIN-00121 Helsinki (FI).</p>	<p>(81) Designated States: CA, JP, KR, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 20 July 1995 (20.07.95)</p>	

(54) Title: CALCULATION OF A SCALAR PRODUCT IN A DIRECT-TYPE FIR FILTER

(57) Abstract

The invention relates to a direct-type FIR filter, a method for calculating a scalar product in a FIR filter, and a method for designing a direct-type FIR filter. Successive words of a digital input signal are delayed in a delay line having delays (50A-50D) of the duration of one word, and the scalar product between the variously delayed words derived from the delay line and the corresponding constant coefficients is calculated. In accordance with the invention, calculation of the scalar product comprises: (a) combining the bits of words at the input (X0) and outputs (X1-X4) of the delay line bit by bit in a network of bit-serial subtractor and/or adder elements (51-56) wherein at least one of the bit-serial elements is involved in the multiplication operation of at least two different coefficients; and (b) multiplying (49A-K) the multiplication results from the network by powers of two, and summing together (45-48) the results to yield the scalar product.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 94/00568

A. CLASSIFICATION OF SUBJECT MATTER		
IPC6: H03H 17/06 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO, A1, 9423493 (SARAMÄKI, TAPIO), 13 October 1994 (13.10.94), see whole document --	1-5
A	EP, A1, 0344326 (VICTOR COMPANY OF JAPAN, LTD), 6 December 1989 (06.12.89), figure 3, abstract --	1-5
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP, A2, 0281101 (NEC CORPORATION), 7 Sept 1988 (07.09.88), see whole document -- -----	1-5

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/05/95

International application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 9423493	13/10/94	NONE	
EP-A1- 0344326	06/12/89	DE-D, T- 3851053 JP-A- 1146418 US-A- 5081604 WO-A- 8905544	01/12/94 08/06/89 14/01/92 15/06/89
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