

Implementation and control of pipelineable fast IIR adaptive filters

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1988 Fiscal Year Final Research Report Summary

Implementation and control of pipelineable fast IIR adaptive filters

Research Project

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Allocation Type

Single-year Grants

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電子通信系統工学

Research Institution

Kanazawa University

Principal Investigator

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Adaptive filter / Echo canceller / All-pass network / Normalized LMS algorithm / Multi-signal processor implementation / シグナルプロセッサ応用 / マルチシグナルプロセッサ構成 / 直交関数系実現回路

Research Abstract

This paper studies design and implementation of a new IIR adaptive filter. The filter has a structure like a transversal filter replaced their delay elements by second order all-pass sections. Any two of their tap responses are orthogonal. System identification is studied. Summary of the results are as follows: 1) The poles of all-pass networks are allotted on the circle in the z-plane, which pole spacing is proportional to the group delay of the object system. The learning characteristics are superior to that of the frequency sampling adaptive filter. 2) In signal processor implementation of all-pass sections, state variable type has least operation steps. 3) For processing of colored signal, correlation removing algorithm is very effective, but variable step size algorithm is not. 4) Multiprocessor implementation is considered. An external RAM is shared with multiprocessors. All-pass part are pipe-linedly operated and weighting coefficients are adjusted with parallel processing.

Research Products (8 results)

AllOther

AllPublications (8 results)

[Publications]

武部幹,奥田裕二: 昭和62年度電気関係学会北陸支部連合大会論文集. 128-129 (1987)

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武部幹,奥田裕二,浜井和夫: 電子情報通信学会技術報告. CAS87-249. 1-6 (1988)

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武部幹,日根龍哉,奥田祐二: 昭和63年度電気関係学会北陸支部連合大会論文集. 165-166 (1988)

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武部幹,日根龍哉,衛良樹: 平成元年度電気関係学会北陸支部連合大会論文集. (1989)

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[Publications]

Tsuyoshi Takebe; Yuji Okuda: "Pole allocation of IIR adaptive filter structure using cascaded second-order state-space all-pass sections." Proc. of 1987 Hokuriku District Joint Symposium of Institutes of Electrieal Engineers. 128-129 (1987)

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Tsuyoshi Takebe; Yuji Okuda; Kazuo Hamai: "Pole arrangement and realization of all-pass/ladder IIR adaptive filter" IEICE Technical Report on CAS. CAS 87-249. 1-6 (1988)

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[Publications]

Tsuyoshi Takebe; Tatsuya Hine; Yuji Okuda: "Signal processor realization of all-pass/ladder IIR adaptive filters." Proc. of 1988 Hokuriku District Joint Symposium of Institutes of Electrical Engineers.165-166 (1988)

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[Publications]

Tsuyoshi Takebe; Tatsuya Hine; Yoshiki Mamori: "System identification and channel equalization using all-pass/ladder adaptive filters." Proc. of 1989 Hokuriku District Joint Symposium of Institutes of Electrical Engineers. (1989)

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