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<u>List of Claims:</u>

Claim 1 (Original): A method for use by an echo canceller to detect an echo path change and adjust to said echo path change, said method comprising:

determining a first bulk delay of an echo signal using a foreground adaptive filter, said foreground adaptive filter being a SPARSE filter;

configuring said foreground adaptive filter to an open-loop mode;

canceling said echo signal based on said first bulk delay using said foreground adaptive filter;

determining a second bulk delay of said echo signal using a background adaptive filter, said background adaptive filter being a SPARSE filter;

configuring said foreground adaptive filter to a closed-loop mode and continuing to cancel said echo signal based on said first bulk delay;

configuring said background adaptive filter to said open-loop mode;

measuring an echo cancellation performance of said foreground adaptive filter and an echo cancellation performance of said background adaptive filter; and

changing parameters of said foreground adaptive filter if said measuring determines that said echo cancellation performance of said background adaptive filter is better than said echo cancellation performance of said foreground adaptive filter.

Claim 2 (Original): The method of claim 1, wherein said changing said parameters includes copying one or more parameters of said background adaptive filter into respective one or more parameters of said foreground adaptive filter.

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Claim 3 (Original): The method of claim 1, wherein said changing said parameters includes:

determining a third bulk delay of the echo signal using said foreground adaptive filter;

configuring said foreground adaptive filter to said open-loop mode to determine new parameters for said foreground adaptive filter; and

configuring said foreground adaptive filter to said closed-loop mode to update said new parameters.

Claim 4 (Original): The method of claim 1, wherein said background adaptive filter is updated more aggressively in presence of a double talk detection than said foreground adaptive filter.

Claim 5 (Original): The method of claim 1 further comprising:

moving said foreground adaptive filter to a downsample domain prior to said determining said first bulk delay; and

moving said foreground adaptive filter to a regular domain for canceling said echo signal based on said first bulk delay.

Claim 6 (Original): The method of claim 1 further comprising:

moving said background adaptive filter to a downsample domain prior to said determining said second bulk delay.

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Claim 7 (Original): The method of claim 1, wherein said background adaptive filter operates in said open-loop mode only.

Claim 8 (Original): The method of claim 1, wherein said measuring measures an echo return loss enhancement (ERLE) of said foreground adaptive filter and an ERLE of said background adaptive filter.

Claim 9 (Original): The method of claim 1 further comprising:

determining a third bulk delay of said echo signal using said background adaptive filter if said measuring determines that said echo cancellation performance of said foreground adaptive filter is better than said echo cancellation performance of said background adaptive filter.

Claim 10 (Original): The method of claim 1 further comprising:

determining a third bulk delay of said echo signal using said background adaptive filter if said measuring determines that said foreground adaptive filter and/or said background adaptive filter are performing badly.

Claim 11 (Original): The method of claim 10, wherein said third bulk delay is indicative of said echo path change.

Claim 12 (Original): The method of claim 1, wherein said determining said second bulk delay occurs prior to configuring said foreground adaptive filter to said closed-loop mode.

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Claim 13 (Original): An echo canceller capable of detecting an echo path change and adjusting to said echo path change, said echo canceller comprising:

a foreground adaptive filter configured to determine a first bulk delay of an echo signal, wherein said foreground adaptive filter is a SPARSE filter, and wherein said foreground adaptive filter is further configured to an open-loop mode and cancels said echo signal based on said first bulk delay, and wherein said foreground adaptive filter is configured to a closed-loop mode after being configured to said open-loop mode, and wherein said foreground adaptive filter continues to cancel said echo signal based on said first bulk delay in said closed-loop mode; and

a background adaptive filter configured to determine a second bulk delay of said echo signal, wherein said background adaptive filter is a SPARSE filter, and wherein said background adaptive filter is further configured to said open-loop mode after determining said second bulk delay;

wherein said echo canceller measures an echo cancellation performance of said foreground adaptive filter and an echo cancellation performance of said background adaptive filter, and changes parameters of said foreground adaptive filter if said echo canceller determines that said echo cancellation performance of said background adaptive filter is better than said echo cancellation performance of said foreground adaptive filter.

Claim 14 (Original): The echo canceller of claim 13, wherein said echo canceller changes said parameters by copying one or more parameters of said background adaptive filter into respective one or more parameters of said foreground adaptive filter.

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Claim 15 (Original): The echo canceller of claim 13, wherein said echo canceller changes said parameters by:

determining a third bulk delay of the echo signal using said foreground adaptive filter;

configuring said foreground adaptive filter to said open-loop mode to determine new parameters for said foreground adaptive filter; and

configuring said foreground adaptive filter to said closed-loop mode to update said new parameters.

Claim 16 (Original): The echo canceller of claim 13, wherein said background adaptive filter is updated more aggressively in presence of a double talk detection than said foreground adaptive filter.

Claim 17 (Original): The echo canceller of claim 13, wherein said foreground adaptive filter determines said first bulk delay in a downsample domain, and wherein said foreground adaptive filter moves to a regular domain for canceling said echo signal based on said first bulk delay.

Claim 18 (Original): The echo canceller of claim 13, wherein said background adaptive filter determines said second bulk delay in a downsample domain.

Claim 19 (Original): The echo canceller of claim 13, wherein said background adaptive filter operates in said open-loop mode only.

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Claim 20 (Original): The echo canceller of claim 13, wherein said echo canceller measures an echo return loss enhancement (ERLE) of said foreground adaptive filter and an ERLE of said background adaptive filter.

Claim 21 (Original): The echo canceller of claim 13, wherein said background adaptive filter determines a third bulk delay of said echo signal if said echo canceller determines that said echo cancellation performance of said foreground adaptive filter is better than said echo cancellation performance of said background adaptive filter.

Claim 22 (Original): The echo canceller of claim 13, wherein said background adaptive filter determines a third bulk delay of said echo signal if said echo canceller determines that said foreground adaptive filter and/or said background adaptive filter are performing badly.

Claim 23 (Original): The echo canceller of claim 22, wherein said third bulk delay is indicative of said echo path change.

Claim 24 (Original): The echo canceller of claim 13, wherein said echo background adaptive filter determines said second bulk delay prior to said foreground adaptive filter is configured to said closed-loop mode.

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