



- (51) **International Patent Classification:**
H03H 17/04 (2006.01)
- (21) **International Application Number:**
PCT/US2013/036932
- (22) **International Filing Date:**
17 April 2013 (17.04.2013)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/645,291 10 May 2012 (10.05.2012) US
- (71) **Applicant:** DOLBY LABORATORIES LICENSING CORPORATION [US/US]; 100 Potrero Avenue, San Francisco, California 94103-4813 (US).
- (72) **Inventor:** RATHI, Khushbu P.; c/o Dolby Labs Licensing Corp, 100 Potrero Avenue, San Francisco, California 94103-4813 (US).
- (74) **Agent:** DOLBY LABORATORIES, INC.; Intellectual Property Group, 100 Potrero Avenue, San Francisco, California 94103-4813 (US).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,

KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

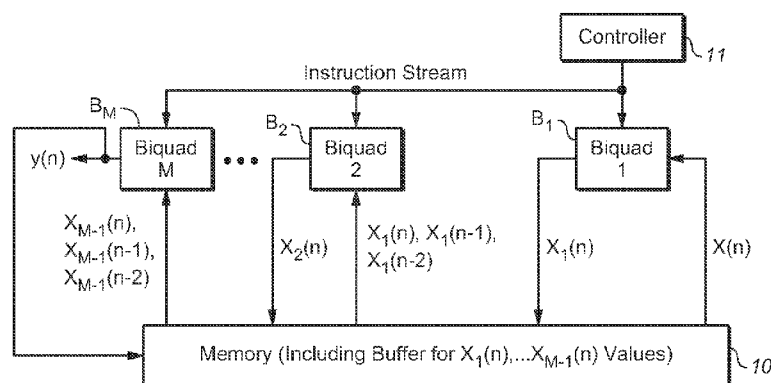
Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) **Title:** MULTISTAGE IIR FILTER AND PARALLELIZED FILTERING OF DATA WITH SAME

**FIG. 4**

(57) **Abstract:** In some embodiments, a multistage filter whose biquad filter stages are combined with latency between the stages, a system (e.g., an audio encoder or decoder) including such a filter, and methods for multistage biquad filtering. In typical embodiments, all biquad filter stages of the filter are operable independently to perform fully parallelized processing of data. In some embodiments, the inventive multistage filter includes a buffer memory, at least two biquad filter stages, and a controller coupled and configured to assert a single stream of instructions to the filter stages. Typically, the multistage filter is configured to perform multistage filtering of a block of input samples in a single processing loop with iteration over a sample index but without iteration over a biquadratic filter stage index.