The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES R. HELLUMS and JAMES R. HOCHSCHILD

Appeal No. 2001-2694
Application No. 09/103,704

ON BRIEF

Before KRASS, BARRETT and RUGGIERO, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-9 and 13.

The invention pertains to a time domain noise analyzer. In particular, a simulator comprises a matrix of electrical circuit elements and an analyzer for analyzing transient responses of the circuit elements in the time domain with a known input signal to provide a deterministic current value for each of the elements. A noise source is associated with each circuit element for

generating a noise current for the associated element, representing a white noise that exists within the element. The generated noise current for each noise source is summed with the deterministic current value for each element and the matrix of elements is solved after performing all of the summing operations.

Representative independent claim 1 is reproduced as follows:

1. A simulator for simulating the noise response of an electrical circuit in the time domain, which simulator operates in discrete time steps T_s, comprising:

a matrix of electrical circuit elements representing the electrical circuit;

an analyzer for analyzing the transient response of the circuit elements in the matrix in the time domain with a known input signal to provide a deterministic current value for each of said elements operating in the electrical circuit;

a stochastic noise source associated with each of said elements, each for generating a noise current for the associated element that represents a stochastic random process comprised of a white noise source scaled by the standard deviation of the physical noise process that exists within said associated element;

a primary summing device is associated with each of said elements for summing the generated noise current for the associated one of said stochastic noise sources with the deterministic current values associated with each of said elements; and

a matrix solver for solving the matrix after said summing device has performed the associated summing operation.

The examiner relies on the following references:

P. Bolcato et al. (Bolcato), "A new approach for Noise simulation in transient analysis," 2 IEEE International Symposium on Circuits and Systems 887-90 (1992)

N. Jeremy Kasdin, "Discrete Simulation of Colored Noise and Stochastic Processes and $1/f^{\alpha}$ Power Law Noise Generation," 83 Proceedings of the IEEE no. 5, 802-27 (May 1995)

Serban-Mihai Popescu et al. (Popescu), "A Noise Modelling Approach for Accurate Time Domain Analysis," IEEE International Semiconductor Conference 553-56 (1996)

Claims 1-9 and 13 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner offers Popescu and Bolcato with regard to claims 1-4 and 13, adding Kasdin with regard to claims 5-9.

Reference is made to the brief and answer for the respective positions of appellants and the examiner.

OPINION

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v, John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or

to combine prior art references to arrive at the claimed invention. Such reason much stem from some teachings, suggestions or implications in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc. , 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1040, 228 USPQ 685, 687 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1051, 189 USPQ 143, 146-47 (CCPA 1976). Only those arguments actually made by appellants have been considered in

this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered and are deemed to be waived (see 37 CFR 1.192 (a)).

The examiner applies Popescu for a teaching of transient noise analysis through simulation in the time domain of a circuit and the generation of stationary noise. Recognizing that Popescu does not teach the generation of noise for each circuit element represented in the simulation, the examiner turns to Bolcato for a teaching of added current sources as representing physical noises of devices. The examiner concludes that it would have been obvious "to incorporate the noise equivalent current sources of Bolcato . . . into the noise simulation methods disclosed by Popescu . . ., because such a combination would permit more accurate noise modelling using a SPICE-type simulator" (answer, page 5).

For their part, appellants argue that whereas independent claims 1 and 13 require a noise source for each circuit element and a summing of the element's noise current with the element's deterministic current, "Popescu simulates with a single noise source for an entire circuit and, in fact, adds the precomputed noise after generating the circuit output (page 554, second and fourth paragraphs of section 2)" (brief, page 3).

Moreover, argue appellants, Bolcato does not provide for the deficiency of Popescu because Bolcato injects a deterministic current source for each noisy element with the frequencies and amplitudes picked to emulate a physical noise spectrum, then performs N + 1 simulation runs, first without the current sources and then N times using the current sources with the phases of the sinusoids varied between runs, citing page 889, left column. Thus, appellants contend, Bolcato has no noise generation during a simulation run but, rather, current source phase increments at the beginning of each simulation run (see brief-page 3). Appellants conclude that "Bolcato does not suggest putting a noise source with each circuit element for simulation in Popescu because Bolcato really does not use noise sources (i.e., something that is random during a simulation run). In fact, Bolcato page 888, right column, fourth paragraphs of section A) specifically avoids them" (brief, pages 3-4).

The examiner's response is to agree with appellants that Popescu teaches a circuit simulation using a single noise source for an entire circuit. However, pointing to the same portion of Popescu as do appellants (page 554, section 2), the examiner argues that Popescu does not add precomputed noise after generating the circuit output and that Popescu, in fact, adds the

noise signal during the simulation in either a time-voltage or a time-current pair corresponding to appellants' "summing device."

The examiner further points out, again, that Bolcato teaches adding noise sources in parallel and relies on the desirability of replacing circuit elements in a simulation with corresponding circuit elements having added noise sources in parallel. It is the examiner's position that such a set of noise sources in parallel, if added to Popescu's system "would then include a stochastic noise source associated with each circuit element that would add the generated noise current with the deterministic current values associated with each circuit element" (answer, pages 7-8), concluding that a "simulation using [sic] made by the system of Popescu with noise elements added in parallel as illustrated by Bolcato would have increased accuracy and would better model the noise process in an actual circuit" (answer, page 8).

After reviewing the references and the arguments by appellants and the examiner, we will not sustain the rejection of claims 1-9 and 13 under 35 U.S.C. § 103 because it is simply not clear to us that the references disclose what the examiner contends they disclose.

We have specifically reviewed page 554 of Popescu which both appellants and the examiner rely on to support their respective positions regarding whether Popescu adds the noise signal during the simulation. While Popescu does disclose that noise traces are saved in files in a form of time-voltage or time-current pairs and "fed at the simulator inputs . . .," possibly arguing for adding noise signals during simulation, the reference, on the same page, indicates that "we shifted the noise generator away from the simulation tool," appearing to indicate that the noise signal is not added during simulation which is clearly required by the instant claims.

In summary, since we must resort to some speculation as to whether Popescu is generating a noise current during simulation, we will not sustain the examiner's rejection of the claims because a rejection under 35 U.S.C. § 103 may not be based on speculation as to what a reference discloses.

Moreover, while Bolcato does appear to disclose the introduction of current sources in each noisy component (page 888, left-hand column), we are not convinced that the artisan would have been led by this teaching to include such a current source in each element in Popescu for generating a noise current for an associated element in a simulator if it is unclear whether

Popescu even discloses the addition of a noise signal *during* simulation. Kasdin, added for other reasons related to claims 5-9, does nothing to provide for the deficiencies of Popescu and Bolcato.

In short, while the examiner has clearly cited very relevant references, we are not convinced, by the examiner's rationale, that the combination of these references would have made the instant claimed subject matter obvious, within the meaning of 35 U.S.C. § 103.

Perhaps the examiner could have made a stronger case by going through each claimed element, one-by-one, and explaining how each element is considered to correspond to a specific teaching of the references. The examiner made only general statements about the teachings of the references without clearly pointing out, where, in the references, for example, the "matrix," the "analyzer" and the "matrix solver" are considered to be taught. Accordingly, we find that the examiner has simply not established a prima facie case of obviousness. While appellants do not argue each and every claimed element and while some of their arguments appear weak, it is the examiner, in the first instance, who must show a reasonable case that each and every claimed element, taken as a whole, is taught, or made

obvious, by the applied references, i.e., the examiner has the initial burden to establish a prima facie case of obviousness with regard to the claimed subject matter. Since the examiner has not set forth a convincing case for obviousness, the burden of showing nonobviousness never shifted to appellants.

The examiner's decision rejecting claims 1-9 and 13 under 35 U.S.C. § 103 is reversed.

REVERSED

ERROL A. KRASS Administrative Patent Judge	)	
LEE E. BARRETT Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JOSEPH F. RUGGIERO Administrative Patent Judge	)	

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Texas Instruments Inc.
P.O. Box 655474, M/S 3999
Dallas, TX 75265