



Enlarged Board of Appeal
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Attn: Mr Wiek Crasborn
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Dear Sirs

Re: Referral to the Enlarged Board of Appeal

G1/19

Brief of Amicus Curiae

International Business Machines Corporation

International Business Machines Corporation (IBM) respectfully submits the following *amicus curiae* brief in the Enlarged Board of Appeal case G1/19.

SUMMARY

In decision T489/14, the Board of Appeal has referred three questions to the Enlarged Board of Appeal relating to the patentability of inventions involving computer-implemented simulation. This referral stems from the Board of Appeal's disagreement with the reasoning applied in T1227/05 (Circuit simulation I/Infineon), which decision has underpinned for over a decade the EPO's analysis of the patentability of these types of inventions.

IBM supports the approach set out in T1227/05 which focused on the technical purpose of a claimed computer simulation to determine whether it had technical character. We do not share the view of the Board in T489/14 and, in particular, we believe that the doubts expressed by the Board with regard to the reasoning in T1227/05 are based on a misinterpretation or mis-reading of that reasoning.

IBM requests that the Enlarged Board uphold the reasoning of EPO Board of Appeal decision T1227/05, which has been widely followed in subsequent decisions. It is clear that the field of computer-implemented simulations encompasses a wide variety of different technologies applied to solve many different problems and we believe that the approach adopted in T1227/05 represents a sensible, practical approach for assessing the patentability of this type of invention under the EPC.

IBM's detailed comments in support of this position are set out below, starting with a discussion of the reasoning of the Board of Appeal in T1227/05.

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T1227/05

The invention in T1227/05 relates to the simulation of the performance of a circuit subject to $1/f$ noise. In T1227/05, the Board was persuaded that *“the simulation of a circuit subject to $1/f$ noise constitutes an adequately defined technical purpose for a computer-implemented method, provided that the method is functionally limited to that technical purpose”* (reasons 3.1) and *“all features relevant to circuit simulation, including the steps expressed by formulae, contribute to the technical character”* (reasons 4).

The Board distinguished the subject invention from inventions having an undefined technical purpose (e.g. simulation of a “technical system”), which would not be patentable. According to T1227/05, to meet eligibility requirements, the claims must identify clear features supported by the description which meet the technical character requirement (reasons 3.1.1).

T1227/05 further explained that (reasons 3.2.2) *“simulation performs technical functions typical of modern engineering work. It provides for realistic prediction of the performance of a designed circuit and thereby ideally allows it to be developed so accurately that a prototype's chances of success can be assessed before it is built. The technical significance of this result increases with the speed of the simulation method, as this enables a wide range of designs to be virtually tested and examined for suitability before the expensive circuit fabrication process starts.”*

Without technical support, advance testing of a complex circuit and/or qualified selection from many designs would not be possible, or at least not in reasonable time. Thus computer-implemented simulation methods for virtual trials are a practical and practice-oriented part of the electrical engineer's toolkit. What makes them so important is that as a rule there is no purely mathematical, theoretical or mental method that would provide complete and/or fast prediction of circuit performance under noise influences”.

The Board in T1227/05 further commented (reasons 3.4.2) in distinguishing over the decision in T453/91 that *“specific technical applications of computer-implemented simulation methods are themselves to be regarded as modern technical methods which form an essential part of the fabrication process and precede actual production, mostly as an intermediate step. In that light, such simulation methods cannot be denied a technical effect merely on the ground that they do not yet incorporate the physical end product.”*

IBM believes the approach adopted by the Board in T1227/05 is still valid and provides a consistent, practical way of determining patentability of inventions involving computer-implemented simulation. The approach of T1227/05 is in line with the purpose of Art. 52 EPC because it not only refers to a technical purpose but also requires that a claimed method is functionally limited to the technical purpose. Accordingly, a computer-based design tool is patentable, whereas a mere mental act carried out by an engineer operating the design tool is not.

For the reasons given in the next section, IBM believes that the Board in T489/14 did not accurately analyse the reasoning set out in T1227/05.

T489/14

Claim 1 of the main request in T489/14 relates to modelling pedestrian crowd movement using computer-implemented simulation.

T489/14 (reasons 7) sets out the following approach for assessing patentability: *“non-technical features are ... to be taken into account in the assessment of inventive step to the extent that they interact with the technical subject-matter of the claim to solve a technical problem or, equivalently, to bring about a technical effect”*. It is further added (reasons 11) that: *“in the Board's view, a technical effect requires, at a minimum, a direct link with physical reality, such as a change in or a measurement of a physical entity”*. The Board in T489/14 did not regard the claimed invention as providing such a technical effect.

In T489/14, the appellant argued that the reasoning in T1227/05 supported the patentability of the claims under appeal. In reasons 15, the Board agreed that T1227/05 supported the appellant's case but it was not *“fully convinced by the decision's reasoning”*. The Board expressed two specific doubts in this regard:

“First, although a computer-implemented simulation of a circuit or environment is a tool that can perform a function “typical of modern engineering work”, it assists the engineer only in the cognitive process of verifying the design of the circuit or environment, i.e. of studying the behaviour of the virtual circuit or environment designed. The circuit or environment, when realised, may be a technical object, but the cognitive process of theoretically verifying its design appears to be fundamentally non-technical.

Second, the decision appears to rely on the greater speed of the computer-implemented method as an argument for finding technicality. But any algorithmically specified procedure that can be carried out mentally can be carried out more quickly if implemented on a computer, and it is not the case that the implementation of a non-technical method on a computer necessarily results in a process providing a technical contribution going beyond its computer implementation.”

Regarding the first doubt, namely that *“the cognitive process of theoretically verifying its design appears to be fundamentally non-technical”*, T1227/05 already addresses this issue (reasons 3.2.1) with the statement: *“while the invention may be preceded by a mental or mathematical act, the claimed result must not be equated with this act. The present claims relate to a simulation method that cannot be performed by purely mental or mathematical means, not to the thought process that led to that simulation method.”* Thus, T1227/05 gives explicit reasons why the claimed simulation method is **not** a purely mental act (or ‘cognitive process’ as argued in T489/14). IBM therefore considers that the first doubt expressed by T489/14 regarding T1227/05 is misplaced.

Regarding the second doubt expressed in T489/14 (that T1227/05 relies on *“the greater speed of the computer-implemented method as an argument for finding technicality”*), we believe that this doubt is based on a flawed reading of the reasoning in T1227/05. A technical purpose is attributed to the simulation method of T 1227/05 on the basis that an *“adequately defined class of technical items”* is simulated including *“a circuit with input channels, noise input channels and output channels whose performance is described by differential equations”* (reasons 3.1.1). To the extent that T 1227/05 does refer to the practicality or speed of a circuit simulation, this is additional to the acknowledged technical purpose as is acknowledged at reason 3.2.5 *“a mere speed comparison is not a suitable criterion for distinguishing between technical and non-technical procedural steps”*.

For these reasons, we think the doubts expressed in T489/14 regarding T1227/05 are not supported by the detailed reasoning provided in T1227/05.

IBM further notes that the Board in T489/14 proposed reintroducing the requirement of a *“direct link with physical reality”* (reasons 11). Both decision T1227/05 and national case law have abandoned this requirement (see for example, in Germany: BGH X ZB 11/98, *“Logikverifikation”*, and

in the UK: Halliburton Energy Services Inc's Applications [2012] RPC 129) due to the changes on how technology is applied in engineering tasks. Computer-based tools are used to design products such as semiconductor chips. Such design tools are products themselves that should be protectable by patent.

Without expressing a specific view on the patentability of the invention in T489/14, IBM believes, based on the analysis above, that if the Board in T489/14 had correctly applied the reasoning in T1227/05 to the claims in T489/14, it might instead have concluded that T1227/05 did not in fact support the appellant's case in T489/14. We submit that a proper interpretation of the reasoning in T1227/05 would have obviated the need for the referral of questions to the Enlarged Board.

In summary, IBM supports the approach of T1227/05, whereby features that serve a technical purpose contribute to the assessment of inventive step. We do not share the doubts expressed in T489/14.

Although for the reasons expressed above, IBM believes that this referral was unnecessary and unhelpful, we answer the referred questions below.

ANSWERS TO THE REFERRED QUESTIONS

Question 1

In the assessment of inventive step, can the computer-implemented simulation of a technical system or process solve a technical problem by producing a technical effect which goes beyond the simulation's implementation on a computer, if the computer-implemented simulation is claimed as such?

Based on the comments made above, IBM submits the answer Yes to Question 1 in accordance with the rationale of T1227/05, namely that a computer-implemented simulation which is performed for a technical purpose cannot be denied a technical effect.

Question 2

If the answer to the first question is yes, what are the relevant criteria for assessing whether a computer-implemented simulation claimed as such solves a technical problem? In particular, is it a sufficient condition that the simulation is based, at least in part, on technical principles underlying the simulated system or process?

IBM submits that the criteria to be applied are the same as for any computer-implemented method in that all features that contribute to the technical character of the invention must be taken into account. A determination of whether the steps of a computer-implemented method contribute to the technical character should be made, per T1227/05, with reference to the technical purpose of the claim. Where the simulation is based on technical principles underlying the simulated system or process, it can be a sufficient condition provided that the computer-implemented simulation has a technical purpose.

Question 3

What are the answers to the first and second questions if the computer-implemented simulation is claimed as part of a design process, in particular for verifying a design?

IBM's answers to the first and second questions are unaffected. Claiming a simulation as part of a process for verifying a design may be one of a number of ways of serving a technical purpose, and so support patentability per T1227/05.

Yours faithfully

A handwritten signature in black ink, appearing to read 'D Litherland', with a stylized flourish at the end.

David Litherland
European Patent Attorney
IBM United Kingdom Ltd