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Datasheet for the decision
of 25 September 2020

Case Number: T 1820/16 - 3.4.03

Application Number: 13178377.1

Publication Number: 2833303

IPC: G06Q10/04

Language of the proceedings: EN

Title of invention:
Method for solving multidimensional optimization problems

Applicant:
Siemens AG Österreich

Headword:

Relevant legal provisions:
EPC Art. 52(1), 52(2), 52(2)(a), 52(3), 123(2)

Keyword:
Patentable invention - (no) - mathematical method
Amendments - allowable (no)

Decisions cited:
T 0914/02, T 1227/05, T 0258/03

Catchword:

Case Number: T 1820/16 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 25 September 2020

Appellant: (Applicant)	Siemens AG Österreich Siemensstraße 90 1210 Wien (AT)
Representative:	Maier, Daniel Oliver Siemens AG Postfach 22 16 34 80506 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 29 February 2016 refusing European patent application No. 13178377.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman   G. Eliasson
Members: J. Thomas
                  T. Bokor

Summary of Facts and Submissions

I.   The appeal is against the decision of the examining
        division refusing European patent application
        No. 13 178 377.1 on the grounds that the claimed method
        constituted subject-matter in the sense of Article
        52(2) and (3) EPC and was therefore not patentable
        under Article 52(1) EPC.

II.   In the statement of the grounds of appeal the appellant
        requested to set aside the decision to refuse the
        application and to remit the case to the examining
        division for further prosecution on the basis of the
        main request (filed with letter dated 22 July 2015) on
        which the decision of the examining division was based
        or on the basis of the auxiliary request submitted with
        the grounds of appeal. Oral proceedings were not
        requested.

III.   In a communication dated 21 February 2020 the Board
        gave its provisional opinion that claim 1 of the main
        and the auxiliary request did no comply with
        Article 123(2) EPC and with Article 52(1) in
        combination with Article 52(2) and (3) EPC.

IV.   In a reply dated 23 April 2020, the appellant provided
        arguments with respect to the objections under
        Article 123(2) EPC raised by the Board and confirmed
        its arguments with respect to the objections raised
        under Articles 52(1), (2) and (3) EPC.

V.   Claim 1 of the main request reads as follows:

1. Method for solving multidimensional optimization prob-
   lems on a set of feasible solutions $\{S_1, \ldots, S_n\}$ of a
   discrete combinatorial problem in a process of configu-
   ration of products, comprising steps of:
- calculating optimization values for the set of feasible
  solutions $\{S_1, \ldots, S_n\}$ by using a set of optimization
  functions $\{f_1, \ldots, f_k\}$
- calculating mean values $\mu(f_i)$ to the set of optimization
  functions $\{f_1, \ldots, f_k\}$ according to $\mu(f_i) = \frac{1}{n} * \sum_{j=1}^{n} f_i(S_j)$
- calculating standard deviation values $s(f_i)$ to the set of
  optimization functions $\{f_1, \ldots, f_k\}$ according to
  $$s(f_i) = \sqrt{\frac{1}{n-1} \sum_{j=1}^{n} (f_i(S_j) - \mu(f_i))^2}$$
- normalize the optimization values for the set of feasi-
  ble solutions $\{S_1, \ldots, S_n\}$ according to
  $$norm(f_i(Sol)) = \frac{f_i(Sol) - \mu(f_i)}{s(f_i)}$$
- accumulate the normalized optimization values
  $norm(f_i(Sol))$ according to $f(Sol) = \sum_{i=1}^{k} norm(f_i(Sol))$
- find a minimum for the accumulated normalized optimiza-
  tion values $\min_{i=1}^{n} f(S_i)$

VI.   Claim 1 of the auxiliary request, which was submitted
       with the grounds of appeal, differs from claim 1 of the
       main request only by replacing the expression 'a set of
       feasible solutions' in line 2 with 'a set of
       <u>technically</u> feasible solutions' (underlining added by
       the Board).

VII.   The applicant's arguments are summarised as follows:

       Concerning the objection under Article 123(2) EPC, the
       appellant stated that the first sentence of the
       description indicated that the subject-matter concerned
       a 'discrete combinatorial problem'. In the second
       paragraph of the description 'knowledge-based

configuration of products and services' as described in
'http://en.wikipedia.org/wiki/Knowledge-
based_configuration;' were given as example of such
discrete combinatorial problems. The skilled person
would thus directly and unambiguously understand that
the claimed method concerned a 'discrete combinatorial
problem', which was also used, for example, for the
'configuration of products'. Therefore, the claimed
limitation was directly and unambiguously disclosed in
the original documents.

Concerning the objections under Articles 52(1), (2)
and (3) EPC, the appellant argued that the subject-
matter defined in claim 1 had technical character and
solved a technical problem. Due to the definition in
claim 1 'in a process of configuration of products' the
method must be understood as being performed by
machines or technical means and was therefore
'computer-implemented'. This followed from the
teachings on page 1, lines 11 to 15 in the description,
where reference was made to an article in Wikipedia
concerning discrete combinatorial problems. This
article was quoted in relation with the general
background of the claimed method, discussing the
solution of combinatorial problems for one exemplified
field, namely the field of artificial intelligence. The
link to the field of artificial intelligence
necessarily implied that the claimed method was
computer-implemented (Grounds of appeal, page 2,
lines 7 to 17).

The appellant further cited three decisions of the
Boards of Appeal (T 1227/05, T 258/03 and T 914/02)
which it considered to support its arguments.

Finally the appellant argued that a product
configuration performed technical functions and was
directly linked to computer programs, because a
qualified selection from many designs necessitated a
computer-implemented method. Also, references to a
"domain-independent" normalization method and to a
"code complexity" in the application indicated without
doubt the necessity to use a computer (see description
page 4, lines 12 to 15). Consequently, neither the
technical character nor the implicit computer
implementation could be questioned, because in claim 1
a combinatorial problem was defined in the context of a
process of configuration of products.

Reasons for the Decision

1.   The appeal is admissible.

2.   The appellant did not request oral proceedings and was
        informed about the preliminary opinion of the Board.
        After reconsideration of the grounds of appeal and the
        additional explanations in the appellant's letter of
        reply, the Board still does not see any reason to
        deviate from its preliminary opinion. Hence, the Board
        considers the case ready for decision (Article 12(8)
        RPBA 2020).

3.   Main request

3.1   Article 123(2) EPC

        Claim 1 of the main request has been amended compared
        to the originally filed claim 1 by introducing the
        wording 'in a process of configuration of products' in
        lines 3 to 4 of the claim.

This expression has no literal basis in the application as filed. Page 1, lines 9 to 15 of the description is the only passage mentioning a 'configuration of products' and refers to the background art with reference to a Wikipedia article and therefore does not form part of the disclosure of the claimed method itself. The cited passage explains in a very general way that combinatorial problems play an important role in economical and technical areas and that examples can be found, inter alia, in the field of 'knowledge-based configuration of products'. A feature taken from the background art, however, cannot normally serve as basis for an amendment of the claimed subject-matter (see *Case Law of the Boards of Appeal*, 9th edition 2019, II.E.1.11.3).

Hence, the Board finds that the originally filed documents do not directly and unambigously disclose that the claimed method is used 'in a process of configuration of products'. Claim 1 does consequently not meet the requirements of Article 123(2) EPC.

3.2   **Articles 52(1), (2) and (3) EPC**

The claimed method of solving optimization problems is defined purely in form of a mathematical method. The input and output data including any technical results that could be derived from the output remain unspecified and the field of application may even be non-technical in nature (economic). Hence, the method defined in claim 1 is considered to be an abstract method which falls under the category of non-inventions set out in Articles 52(2)(a) and (3) EPC (see *Case Law of the Boards of Appeal*, 9th edition 2019, I.A.2.2.2).

A computer-implementation is neither explicitly
specified in claim 1 nor could it be acknowledged as
being implicit from the present wording of claim 1
considering the overall context of the application. The
word 'computer' is mentioned only once in the entire
application documents, namely on page 1, line 26 of the
description, where 'computer-based information systems'
are mentioned in relation to the background art.
Throughout the whole application, the claimed method is
presented as an abstract method without any condition
of being 'computer-implemented'. The passages to which
the appellant refers (i.e. page 4, lines 12 to 24) are
not sufficient to render the computer-implementation
mandatory, because the presentation remains general and
the verb "to compute" does not necessarily imply the
use of a digital computer. The wording of the claims
and the presentation of the matter in the description
concerns a mathematical method of a multidimensional
optimisation problem as such for which no computer-
implementation is defined. Moreover, a complex
formulation of the optimization problem is not
sufficient to imply that the method must be computer-
implemented. In accordance with the decision T 0914/02
(Reasons, point 2.3.4), the Board finds that if the use
of computer means were indeed indispensable, then it
would have been necessary to include the computer-
implementation as an essential feature in the claimed
method.

The optimisation problem itself and the related object
defined in claim 1 do also not have technical character
either. The entire claim defines the subject matter in
an abstract way by a purely mathematical formulation as
such. Neither a specific technical field is specified
nor any specific technical input or output data nor any
possible technical effects resulting therefrom.

In addition, an optimisation of economical/financial/ business data is not excluded and the description even includes the economical domain as one possible field of application besides the technical domain. In case of optimising financial/economical problems which are understood as non-technical business contributions no technical contribution is provided.

Because the area in which the optimization is carried out and the optimized input and output data itself remain vague and unspecified, the technical character can only reside in the manner how the optimization is carried out. However, since this is defined by pure mathematics as such (Art. 52(2)(a) EPC), no technical character can be acknowledged.

3.3   The appellant cited the decisions T 1227/05, T 258/03 and T 914/02 of the Boards of Appeal in order to support the argument that the claimed subject-matter should be considered technical and not be excluded pursuant to Articles 52(2) and (3) EPC. The Board finds however for the following reasons that the findings of these decisions are not applicable to the present case.

3.3.1   In T 1227/05 the claimed method explicitly related to a computer-implemented method of a simulation of an integrated circuit. All steps relevant to the circuit simulation, as well as the computer-implementation, were considered to contribute to the technical character of the invention. Hence, in contrast to the present case, the claimed method steps as such did not fall under the provisions of Articles 52(2) and (3) EPC.

3.3.2   A similar situation applies for T 258/03 where the
        claimed method under consideration comprised the
        technical feature 'executed in a server computer
        comprising the steps of'. The board held that a method
        involving technical means was an invention within the
        meaning of Article 52(1) EPC, contrary to the present
        case where no such technical means are present.

3.3.3   Finally, in T 914/02 the deciding board held that the
        involvement of technical considerations (loading
        nuclear reactor fuel bundles into a reactor core) was
        not sufficient to escape the exclusion as long as the
        claimed method defined procedural steps which might
        exclusively be carried out mentally (Reasons, point
        2.3.3). The deciding Board also questioned if 'an
        alleged sheer complexity' of a problem and its
        associated solution automatically implied a technical
        character through an implicit use of technical means,
        in particular a computer. Rather, if the computer means
        were indispensable, they should be included in the
        claims as an essential feature of the invention
        (Reasons, point 2.3.4).

3.4   Therefore, the present Board concludes that the main
        request is not allowable, because it contravenes
        Article 123(2) EPC and its subject-matter is not
        regarded as an invention pursuant to Article 52(1) EPC
        in combination with Articles 52(2) and (3) EPC and
        therefore not patentable.

4.   Auxiliary request

4.1   The objections under Article 123(2) EPC given for the
        main request in respect of the feature "in a process of
        configuration of products" apply in an identical manner
        to the auxiliary request.

4.2   The introduction of the term "technically" does not
        provide a sufficiently clear limitation with regard to
        the unspecified input and output data and is therefore
        not sufficient to confer a clear technical character to
        the claimed subject-matter. It does also not render the
        computer-implementation compulsory or exclude the
        application of the method to economical problems, so
        that all arguments presented under point 3.2 above with
        respect to the main request apply *mutatis mutandis* to
        the auxiliary request.

5.   **Conclusion**

        The main and the auxiliary requests do not fulfil the
        requirements of Article 123(2) EPC and concern
        subject-matter which is not patentable pursuant to
        Article 52(1), (2) and (3) EPC. Therefore, the appeal
        must fail.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Sánchez Chiquero   G. Eliasson

Decision electronically authenticated