UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/877,592	05/16/2013	Keizo Akutagawa	Q203353	5010

23373   7590   03/09/2020

SUGHRUE MION, PLLC
2000 PENNSYLVANIA AVENUE, N.W.
SUITE 900
WASHINGTON, DC 20006

EXAMINER
DALBO, MICHAEL J

ART UNIT	PAPER NUMBER
2865	

NOTIFICATION DATE	DELIVERY MODE
03/09/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PPROCESSING@SUGHRUE.COM
USPTO@sughrue.com
sughrue@sughrue.com

PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE
_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD
_____

Ex parte KEIZO AKUTAGAWA
_____

Appeal 2018-006504
Application 13/877,592
Technology Center 2800
_____

Before CAROLYN D. THOMAS, CARL W. WHITEHEAD JR., and
MICHAEL J. STRAUSS, *Administrative Patent Judges.*

STRAUSS, *Administrative Patent Judge.*

DECISION ON APPEAL[1]

Pursuant to 35 U.S.C. § 134(a), Appellant[2] appeals from the
Examiner's decision to reject claims 1, 3–5 and 7–12. *See* Final Act. 1. We
have jurisdiction under 35 U.S.C. § 6(b). Oral argument was held on
February 25, 2020. A copy of the transcript will be added to the record in
due course.

---

[1] We refer to the Specification, filed April 3, 2013 as mended on June 23,
2017 ("Spec."); Final Office Action, mailed July 28, 2017 ("Final Act.");
Appeal Brief, filed February 12, 2018 ("Appeal Br."); and Examiner's
Answer, mailed April 9, 2018 ("Ans.").
[2] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R.
§ 1.42. Appellant identifies the real party in interest as Bridgestone
Corporation. Appeal Br. 2.

We AFFIRM.

<div style="text-align: center;">

THE INVENTION
</div>

Appellant describes the present invention as follows:

An elastic response performance prediction method that employs a finite element analysis method to predict an elastic response performance expressing deformation behavior of a rubber product. The elastic response performance of the rubber product is predicted by employing a constitutive equation that expresses temperature and strain dependence of strain energy in the rubber product, and that incorporates a number of links between cross-linked points in a statistical molecule chain, which is expressed using a parameter representing extension crystallization.

Spec., Abstract.

Independent claim 1 represents the appealed claims. It is reproduced below with formatting modified for clarity and with emphasis added to the claim language that recites additional elements beyond the abstract ideas:

1. An elastic response performance prediction method that predicts an elastic response performance expressing deformation behavior of a rubber product, the elastic response performance prediction method comprising:

[(i)] generating a model of the rubber product,

[(ii)] receiving user input *on an input-output terminal* to set a constitutive equation as a framework condition of the rubber product,

[(iii)] applying the framework condition to the model of the rubber product, and reconstructing model data of the model,

[(iv)] deforming the model under the framework condition and predicting the elastic response performance of the rubber product wherein the constitutive equation is a constitutive equation that expresses temperature and strain dependence of strain energy in the rubber product, and that incorporates a number of links between crosslinked points in a statistical

<div style="text-align: center;">

2
</div>

molecule chain which is expressed using a parameter representing extension crystallization, and

[(v)] displaying the predicted elastic response performance of the rubber product *on a display*,

[(vi)] wherein a number of links n between the cross-linked points in the statistical molecule chain is expressed by the following Equation (I):

$$n = \alpha \cdot (1 - X_c) \cdot exp(-\varepsilon \cdot \beta) \quad \ldots (I)$$

[(vii)] wherein α represents a frequency factor of statistical segment motion, ε represents an activation energy of statistical segment motion, $\beta = 1/RTg$ wherein R is a gas constant and Tg is a glass transition temperature, Xc represents a crystallization ratio as a parameter expressing the extension crystallization, and Xc is expressed by the following Equation (II) when a material of the rubber product exhibits extension crystallization properties:

$$X_c = \left(\frac{U_1 - U_0}{\Delta H_0}\right) = \left(\frac{\Delta U}{\Delta H_0}\right) \quad \ldots (II)$$

[(viii)] wherein U_0 represents internal energy in a non-deformed state, U_1 represents internal energy in a deformed state, and ΔH_0 represents entropy of solution when crystals melt,

[(ix)] *wherein the elastic response performance prediction method is implemented with a processor*.

REJECTION[3]

Claims 1, 3–5, and 7–12 stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter without reciting significantly more. Final Act. 3–5.

OPINION

We review the appealed rejections for error based upon the issues identified by Appellant, and in light of the arguments and evidence produced

---

[3] An objection to claim 7 (Final Act. 2) is not before us.

thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential).
Arguments not made are waived. *See* 37 C.F.R. § 41.37(c)(1)(iv).

We select claim 1 as the representative claim for the rejection.
Appellant does not argue separate eligibility for claims 3–5 and 7–12.

Having reviewed the Appellant's arguments regarding this § 101
rejection, we are not persuaded the Examiner erred. We agree with and
adopt the Examiner's findings and reasoning in the Final Office Action and
the Answer as our own and add any additional findings of fact appearing
below for emphasis.

STANDARD OF REVIEW

The Board undertakes a limited *de novo* review of the appealed
rejections for error based upon the issues identified by Appellant, and in
light of the arguments and evidence produced thereon. *Ex parte Frye*,
94 USPQ2d 1072, 1075 (BPAI 2010) (precedential).

PRINCIPLES OF LAW

A. Section 101

An invention is patent-eligible if it claims a "new and useful process,
machine, manufacture, or composition of matter." 35 U.S.C. § 101.
However, the U.S. Supreme Court has long interpreted 35 U.S.C. § 101 to
include implicit exceptions: "[l]aws of nature, natural phenomena, and
abstract ideas" are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int'l*, 573
U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we
are guided by the Court's two-part framework, described in *Mayo* and *Alice*.

Id. at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first determine what concept the claim is "directed to." *See Alice*, 573 U.S. at 219 ("On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.,* the use of a third party to mitigate settlement risk."); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) ("Claims 1 and 4 in petitioners' application explain the basic concept of hedging, or protecting against risk.").

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); "tanning, dyeing, making waterproof cloth, vulcanizing India rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1853))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Court held that "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula." *Diehr*, 450 U.S. at 187; *see also id.* at 191 ("We view respondents' claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula."). Having said that, the Court also indicated that a claim "seeking patent protection for that formula in the

abstract . . . is not accorded the protection of our patent laws, and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." *Id.* (citation omitted) (citing *Benson* and *Flook*); *see, e.g.*, *id*. at 187 ("It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221 (quotation marks omitted). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* (alterations in original) (quoting *Mayo*, 566 U.S. at 77). "[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

B. USPTO Section 101 Guidance

In January 2019, the U.S. Patent and Trademark Office (USPTO) published revised guidance on the application of § 101. *See 2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) ("2019 Revised Guidance").[4] "All USPTO personnel are, as a matter of

---

[4] In response to received public comments, the Office issued further guidance on October 17, 2019, clarifying the 2019 Revised Guidance. USPTO, *October 2019 Update: Subject Matter Eligibility* (the "October 2019 Update") (available at https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.pdf).

6

internal agency management, expected to follow the guidance." *Id.* at 51;
see also October 2019 Update at 1.

Under the 2019 Revised Guidance and the October 2019 Update, we
first look to whether the claim recites the following:

> (1) any judicial exceptions, including certain groupings of abstract
> ideas (i.e., mathematical concepts, certain methods of organizing
> human activity such as a fundamental economic practice, or mental
> processes) ("Step 2A, Prong One"); and
>
> (2) additional elements that integrate the judicial exception into a
> practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h) (9th ed.
> Rev. 08.2017, Jan. 2018)) ("Step 2A, Prong Two").[5]

2019 Revised Guidance, 84 Fed. Reg. at 52–55.

Only if a claim (1) recites a judicial exception and (2) does not
integrate that exception into a practical application, do we then look, under
Step 2B, to whether the claim:

> (3) adds a specific limitation beyond the judicial exception that is not
> "well-understood, routine, conventional" in the field (*see* MPEP
> § 2106.05(d)); or
>
> (4) simply appends well-understood, routine, conventional activities
> previously known to the industry, specified at a high level of
> generality, to the judicial exception.

---

[5] This evaluation is performed by (a) identifying whether there are any
additional elements recited in the claim beyond the judicial exception, and
(b) evaluating those additional elements individually and in combination to
determine whether the claim as a whole integrates the exception into a
practical application. *See* 2019 Revised Guidance - Section III(A)(2), 84
Fed. Reg. 54–55.

2019 Revised Guidance, 84 Fed. Reg. at 52–56.

<center>THE DETERMINATIONS AND CONTENTIONS</center>

The Examiner determines "[c]laim 1 is directed to the abstract idea/data processing algorithm for predicting the elastic response performance of a rubber product." Final Act. 3. The Examiner characterizes the preamble of claim 1 together with limitations (i), (iii), (iv), and (vi) through (viii) as mathematical relationships/formulas. *Id.* at 6. According to the Examiner, the claims recite gathering, analyzing, and displaying the results of the data analysis that are similar to claims determined to be patent ineligible in *Electric Power Grp., LLC v. Alstrom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016). The Examiner further determines the claimed data processing algorithm implements mathematical equations that are similar to the Arrhenius equation[6] recited by claims considered by the Court in *Diehr*. *Id.* (citing "April 2017: Interim Eligibility Guidance Quick Reference Sheet"). According to the Examiner, however, "unlike *Diehr*, the results of the current claims are not applied to the physically process of curing rubber using a rubber molding apparatus." *Id.* The Examiner further determines the additional elements of receiving user input and displaying the predicted elastic response performance are insignificant extra-solution activities. *Id.* The Examiner also determines "[t]he additional element of wherein the elastic response performance prediction method is implemented with a processor does not offer a meaningful limitation beyond generally linking the use of the method to a computer." *Id.*

---

[6] The Arrhenius equation is a formula for the temperature dependence of reaction rates and is used to calculate the cure time in rubber-molding presses. *Diamond v. Diehr*, 450 U.S. at 193.

<center>8</center>

Appellant argues the Examiner improperly determines the claims are directed to an abstract idea based on a finding that the claims involve mathematics. Appeal Br. 11 (citing *Thales Visionix Inc. v. United States,* 850 F.3d 1343, 1347 (Fed. Cir. 2017)). Appellant contends the claims are not directed to an abstract idea, arguing "[t]he subject matter to which the claims is directed is . . . an improved 'elastic response performance prediction method.'" *Id.* at 16 (citing Spec. ¶¶ 3, 27–29, 31, 101). According to Appellant, the claimed method is "capable of raising prediction precision of the elastic response performance of rubber products even when the rubber product has extension crystallization properties."[7] *Id.* Appellant cites *Thales*, arguing there is no requirement for a final step that would apply the results of the prediction to a physical process, e.g., production of a rubber product. *Id.* at 16. Appellant further argues, under Step 2B, the claims include significantly more: "For example, the recitation 'capable of raising prediction precision of the elastic response performance of rubber products even when the rubber product has extension crystallization properties' shows this application provides significantly more [than] conventional methods." *Id.* at 18.

The Examiner responds, finding, unlike Appellant's claims, the claims determined to be patent eligible in *Thales* "specified a particular, unconventional sensor configuration." Ans. 3. The Examiner further

---

[7] Extension crystallization is a parameter representing a number of links between cross-linked points in a statistical molecule chain. Spec. ¶ 30. Cross-linking of polymers, such as rubber, connects chains to each other making the overall structure more rigid and less elastic. *See* "Rubber Elasticity." *Wikipedia*, Wikimedia Foundation, 18 Feb. 2020, en.wikipedia.org/wiki/Rubber_elasticity. Accessed 26 Feb. 2020.

disputes the rejection is improper as equating the underlying mathematical nature of the application with abstractness. *Id.* at 4. Instead, the Examiner explains, consistent with guidance then in effect, mathematical relationships and formulas recited by the claims were identified as patent-ineligible concepts. *Id.* "The identification of the mathematical data processing algorithm properly identifies the abstract claim limitations within the pending claims." *Id.* Addressing the *Diehr* decision, the Examiner notes

> "While the claims [in *Diehr*] . . . included a mathematical data processing algorithm, the results of the algorithm were integrally tied to the process of curing rubber using a rubber molding apparatus. The results of the abstract data analysis of *Diehr* were utilized to control and improve the rubber molding process via opening the rubber mold i.e. opening the rubber mold at the optimal determined curing time. In this instance, the pending claims do not include any limitations relating to a rubber molding process.

Id. at 4–5. The Examiner also dismisses Appellant's argument the claims cannot be abstract because they are directed to a novel concept. *Id.* at 5 (citing *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016)). Furthermore, according to the Examiner, any improvement in prediction precision is part of (i.e., an improvement to) the abstract idea itself.

Rejecting Appellant's arguments analogizing the rejected claims to those found patent-eligible in *BASCOM*[8] (Appeal Br. 15–16), the Examiner finds the rejected claims have no meaningful additional limitations corresponding to the content filtering feature in that case. *Id.* at 6. Instead,

---

[8] *BASCOM Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016).

the Examiner finds the claims are comparable to those determined to be patent ineligible in *Electric Power Group*,[9] *Fairwarning*,[10] and *Flook*.[11]

ANALYSIS

Step 2A, Prong 1

We agree with the Examiner that the appealed claims are directed to "a data processing algorithm for calculating an elastic response performance expressing deformation behavior of a rubber product." Final Act. 19. We further agree "[t]he claimed data processing algorithm encompasses a series of mathematical steps." *Id.* at 19–20. We still further agree that the steps recited by each of the claims include collecting and analyzing data and displaying the results of the analysis, the claims being similar to those found patent ineligible in *Electric Power Group*, *Fairwarning*, and *Flook*. Ans. 7. Certain ones of the recited steps reasonably can be characterized, then, as mathematical concepts (e.g., mathematical relationships, formulas, equations, or calculations), and/or as mental processes, as explained below.

Limitation (i) of claim 1, for example, includes the following language:

generating a model of the rubber product;

---

[9] *Elec. Power Grp.,* 830 F.3d at 1355 (explaining that "selecting information, by content or source, for collection, analysis, and display does nothing significant to differentiate a process from ordinary mental processes").

[10] *FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1094 (Fed. Cir. 2016) ("collecting and analyzing information to detect misuse");

[11] *Parker v. Flook*, 437 U.S. at 594–95 (a mathematical formula for computing alarm limits in a catalytic conversion process).

Appellant's Specification describes a corresponding microstructure model for statistical thermodynamic computation, and provides an equation implementing the model as:

$$\Delta A = \Delta U + \rho \Delta V - T \Delta S = f(\bar{Z}_{int}, \bar{Z}_{rot}, \bar{Z}_{trans}) = g(H_{int}, H_{rot}, H_{trans})$$

Spec. ¶ 68. Thus, limitation (i) reasonably can be characterized as a mathematical formula, equation, or calculation that is a mathematical concept. The 2019 Revised Guidance recognizes mathematical concepts as constituting abstract ideas. 2019 Revised Guidance, 84 Fed. Reg. at 52. As such, limitation (i) recites a mathematical concept that the 2019 Revised Guidance recognizes as an abstract idea.

Limitation (ii) recites, in part, the following language:

... set[ting] a constitutive equation as a framework condition of the rubber product.

Appellant directs attention to paragraph 94 of the Specification for disclosing limitation (ii). In relevant part, the Specification discloses: "The analysis condition setting includes framework conditions of the rubber portion of the 3D-model, and setting framework conditions for filler portions." Spec. ¶ 94. As disclosed, the framework conditions are used in connection with an appropriate constitutive equation. *Id.* Setting conditions of an equation reasonably can be characterized as a mathematical relationship, formula, equation, or part of a calculation that is a mathematical concept recognized as abstract idea.

Limitation (iii) recites the following language:

applying the framework condition to the model of the rubber product, and reconstructing model data of the model.

Appellant directs attention to paragraph 95 of the Specification for describing step (iii). Appeal Br. 4. However, the cited portion of the

Specification does not provide additional details of what is meant by applying the framework condition to the model. Thus, under a broad but reasonable interpretation, step (iii) sets values of model parameters (i.e., variables) which, as explained above, are defined by a mathematical relationship or equation. Accordingly, steps (iii) reasonably can be characterized as a mathematical concept that the 2019 Revised Guidance recognizes as constituting an abstract idea. 2019 Revised Guidance, 84 Fed. Reg. at 52.

Limitation (iv) recites the following language:

> deforming the model under the framework condition and predicting the elastic response performance of the rubber product wherein the constitutive equation is a constitutive equation that expresses temperature and strain dependence of strain energy in the rubber product, and that incorporates a number of links between crosslinked points in a statistical molecule chain which is expressed using a parameter representing extension crystallization.

Appellant directs attention to paragraphs 95 and 96 of the Specification for describing step (iv) (Appeal Br. 4), which read as follows:

> Next, the computer 50 employs the reconstructed 3D-model data to analyze with a *finite element method* the strain and the internal stress distribution in the 3D-model, and the stress values of the 3D-model as a whole resulting from vehicle load bearing on the tire, internal pressure of the tire, rolling of the tire etc. when the 3D-model is changed under the framework conditions that have been set.

Spec. ¶ 96 (emphasis added). Appellant's Specification further discloses "the present invention relates to a prediction method that employs a *Finite Element Analysis* (FEA) method to predict an elastic response performance of a rubber product." Spec. ¶ 1 (emphasis added). In connection with the FEA method, Appellant further discloses "Energy constitutive *equations* that

are employed in FEA *computation* and in the analysis reflect a stress-strain relationship of a rubber material, migrate linear elasticity *equations* into Mooney-Rivlin *equations*, and recently non-linear constitutive *equations* are being introduced for regions of large deformation in such energy constitutive *equations*." Spec. ¶ 2 (emphasis added). Thus, deforming step (iv) is reasonably interpreted to include the application of FEA which is accomplished using the disclosed mathematical formulas, equations, or calculations that are mathematical concepts. Accordingly, deforming step (iv) reasonably can be characterized as a mathematical concept that the 2019 Revised Guidance recognizes as constituting abstract ideas. 2019 Revised Guidance, 84 Fed. Reg. at 52.

Limitation (v) recites, in part, the following language:

> displaying the predicted elastic response performance of the rubber product.

The generic displaying of information can be accomplished using the human mind and pen and paper and, as such, is reasonably characterized as a mental process. *See, e.g.*, *Elec. Power Grp.*, 830 F.3d at 1354 ("And we have recognized that merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation), is abstract as an ancillary part of such collection and analysis.") (citing *Content Extraction*, 776 F.3d at 1347; *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715 (Fed. Cir. 2014); *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1340 (Fed. Cir. 2017) (holding that displaying data is an abstract idea); October 2019 Update at 19 n.20 ("While there is no enumerated grouping that encompasses data analysis and display *per se* in the 2019 [Revised Guidance

(PEG)], claims containing this type of limitation may still recite an abstract idea under the 2019 PEG.") The 2019 Revised Guidance recognizes such mental processes as constituting abstract ideas. 2019 Revised Guidance, 84 Fed. Reg. at 52. As such, limitation (v) recites a mental process, which is a recognized abstract idea.

Limitations (vi) through (viii) recite the following language:

[(vi)] wherein a number of links n between the cross-linked points in the statistical molecule chain is expressed by the following Equation (I):

$$n = \alpha \cdot (1 - X_c) \cdot exp(-\varepsilon \cdot \beta) \quad \dots \text{(I)}$$

[(vii)] wherein α represents a frequency factor of statistical segment motion, ε represents an activation energy of statistical segment motion, $\beta = 1/RTg$ wherein R is a gas constant and Tg is a glass transition temperature, Xc represents a crystallization ratio as a parameter expressing the extension crystallization, and Xc is expressed by the following Equation (II) when a material of the rubber product exhibits extension crystallization properties:

$$X_c = \left(\frac{U_1 - U_0}{\Delta H_0}\right) = \left(\frac{\Delta U}{\Delta H_0}\right) \quad \dots \text{(II)}$$

[(viii)] wherein U_0 represents internal energy in a non-deformed state, U_1 represents internal energy in a deformed state, and ΔH_0 represents entropy of solution when crystals melt.

Thus, limitations (vi) through (viii) recite mathematical formulae defining parameters used in deforming the model. Accordingly, these limitations reasonably can be characterized as mathematical concepts that the 2019 Revised Guidance recognizes as constituting abstract ideas. 2019 Revised Guidance, 84 Fed. Reg. at 52. As such, limitations (vi) through

(viii) recite mathematical concepts that the 2019 Revised Guidance recognizes as abstract ideas.

For these reasons, we determine that at least limitations (i) through (vii) of claim 1 recite judicial exceptions to patent-eligible subject matter under step 2A, prong 1, of the 2019 Revised Guidance. Our reviewing court has found claims to be directed to abstract ideas when they recited similar subject matter. *See Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939) ("[A] scientific truth, or the mathematical expression of it, is not patentable invention."); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1163 (Fed. Cir. 2018) (holding that claims to a "series of mathematical calculations based on selected information" are directed to abstract ideas); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1350 (Fed. Cir. 2014) (holding that claims to a "process of organizing information through mathematical correlations" are directed to an abstract idea); *Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Can. (U.S.)*, 687 F.3d 1266, 1280 (Fed. Cir. 2012) (identifying the concept of "managing a stable value protected life insurance policy by performing calculations and manipulating the results" as an abstract idea).

Step 2A, Prong 2

Under step 2A, prong 2, of the 2019 Revised Guidance, we analyze whether any of the additional elements beyond the abstract idea integrate the abstract ideas into a practical application. 2019 Revised Guidance, 84 Fed. Reg. at 54. The 2019 Revised Guidance provides exemplary considerations that are indicative of an additional element or combination of elements integrating the judicial exception into a practical application, such as an additional element reflecting an improvement in the functioning of a

computer or an improvement to other technology or technical field. *Id.* at

55; MPEP § 2106.05(a).

In addition to determining the actions required by limitations (ii) and

(v) recite mathematical concepts and mental processes, these limitations also

constitute insignificant extra-solution activity to the judicial exception. *C.f.*

Final Act. 5. In particular, limitation (ii) more fully recites "*receiving user*

input on an input-output terminal to set a constitutive equation as a

framework condition of the rubber product" (emphasis added). This

limitation reasonably can be characterized as merely constituting the

insignificant pre-solution activity of data gathering.

> An example of pre-solution activity is a step of gathering data for
> use in a claimed process, *e.g.,* a step of obtaining information
> about credit card transactions, which is recited as part of a
> claimed process of analyzing and manipulating the gathered
> information by a series of steps in order to detect whether the
> transactions were fraudulent.

MPEP § 2106.05(g).

Limitation (v) recites "displaying the predicted elastic response

performance of the rubber product on a display." Limitation (v) is ancillary

to the claimed prediction and does not add any meaningful limitations to the

noted abstract ideas because it reasonably may be characterized as merely

being directed to the insignificant post-solution activity of displaying data.

See, e.g., *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1241–42 (Fed.

Cir. 2016) (holding that printing or downloading generated menus

constituted insignificant extra-solution activity).

Limitation (ix) recites "wherein the elastic response performance

prediction method is implemented with a processor." We agree with the

Examiner that this additional element "does not offer a meaningful

limitation beyond generally linking the use of the method to a computer."
Final Act. 5. *See also* 2019 Revised Guidance, 84 Fed. Reg. at 54; *Alice*,
573 U.S. at 221 ("[M]erely requir[ing] generic computer implementation[]
fail[s] to transform that abstract idea into a patent-eligible invention.");
MPEP § 2106.05(f)(2) ("Use of a computer or other machinery in its
ordinary capacity for economic or other tasks (*e.g.*, to receive, store, or
transmit data) or simply adding a general purpose computer or computer
components after the fact to an abstract idea (*e.g.*, a fundamental economic
practice or mathematical equation) does not provide significantly more.").

Contrary to Appellant's argument, we do not agree the Examiner
determines the claims are directed to an abstract idea *because* they involve
mathematics. Appeal Br. 11. Instead, the Examiner determines, consistent
with the claim preamble, the claims are directed to data processing algorithm
for predicting the elastic response performance of a rubber product (Final
Act. 3) by reciting (i) mathematical concepts considered to be abstract (*id.* at
3–5) and (ii) additional elements that are insignificant extra-solution
activates incident to the mathematical concepts (*id.* at 5–6). Furthermore,
the Examiner determines the argued improved prediction result obtained by
the claimed method (*see* Ans. 16) "is part of the abstract idea itself." *Id.* at
7. That is, rather than improving the functioning of a computer or providing
some other technical advantage, the alleged improved result is an
improvement to predicting the elastic response performance of a rubber
product, i.e., suppling information that is more precise. Unlike the method
of operating a rubber-molding press that provided an improved molded
rubber product as claimed in *Diehr*, Appellant's claim only provides, at best,
improved (i.e., more precise) information or data.

We are also unpersuaded by Appellant's citation to *Thales* in arguing there is no requirement to apply the results to a physical process. Appeal Br. 16. *Thales* "utilize[d] mathematical equations to determine the orientation of [an] object relative to the moving reference frame," including "claims [that sought] to protect only the application of physics to the *unconventional configuration of sensor*." *Thales*, 850 F.3d 1348–49 (emphasis added). We find no corresponding technical improvement provided by Appellant's claims other than to the underlying abstract concept of using mathematical formulas to predict the elastic response performance of a rubber product.

In summary, Appellant has not persuaded us the additionally claimed elements, viewed both individually and as an ordered combination, improve the functioning of a computer, recite a particular machine or transformation, or provide any other meaningful limitations. MPEP § 2106.05(a)–(c), (e). That is, Appellant does not demonstrate the invention integrates that recited abstract ideas of claim 1 into a practical application within the meaning of the 2019 Revised Guidance.

Step 2B

As noted above, the only claim element beyond the recited abstract idea is the use of a processor. Claim 1, limitation (ix). Although the Examiner's identification of additional elements differs somewhat from ours,[12] we nonetheless determine the additional elements under either

---

[12] We note our reviewing court recognizes that "[a]n abstract idea can generally be described at different levels of abstraction." *Apple*, 842 F.3d at 1240. That need not and, in this case does not, "impact the patentability analysis." *Id.* at 1241. Further, "[a]n abstract idea can generally be described at different levels of abstraction. . . . The Board's slight revision of its abstract idea analysis does not impact the patentability analysis." *Id.*

analysis simply append well-understood, routine and conventional activities known to the industry specified at a high level of generality to the judicial exception. Final Act. 4. Appellant's Specification does not reasonably indicate that, at the time of the invention, there was anything technologically challenging about (1) receiving user input on an input-output terminal (limitation (ii)), (2) displaying the predicted elastic response performance of the rubber product on a display (limitation (v)), or (3) implementing the elastic response performance prediction method with a processor (limitation (ix)). *See generally* Spec. To the contrary, Appellant only discloses a computer system for implementing the claimed method at a high level of generality, describing it only as "configured with a CPU, ROM, RAM, a hard disk, an input-output terminal, and other required units." Spec. ¶ 63. *See also* Figure 1 (depicting what appears to be a generic personal computer with a keyboard and monitor).

For these reasons, we determine that claim 1 does not recite additional elements that, either individually or as an ordered combination, amount to significantly more than the judicial exception within the meaning of the 2019 Guidance. 2019 Revised Guidance, 84 Fed. Reg. at 52–55; MPEP § 2106.05(d).

Conclusion

Appellant has not adequately demonstrated that the Examiner erred in determining that claim 1 recites one or more abstract ideas, that the claim fails to integrate the abstract idea into a practical application, or that the additional claim elements add a specific limitation beyond the judicial exception that is not "well-understood, routine, and conventional.

Accordingly, Appellant does not persuade us of that the Examiner erred in concluding that claim 1 is directed to patent-ineligible subject matter.

Accordingly, we affirm the § 101 rejection of independent claim 1. We also affirm this rejection of claims 3–5 and 7–12, which Appellant does not argue separately. Appeal Br. 18.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1, 3–5, 7–12	101	Eligibility	1, 3–5, 7–12	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED