Date	February 25, 1994	Court	Osaka High Court,
Case number	1990 (Ne) 2615		8th Civil Division

− A case in which the court ruled that the copyright holder of a work concerning mathematics cannot obtain copyright protection for the process of solving a proposition presented therein and the equation used to explain the process.

References: Article 2, paragraph (1), item (i), Article 21, and Article 27 of the Copyright Act
Number of related rights, etc.:

Summary of the Judgment

1. Background, etc.

The appellant is a researcher who majored in biophysics at the Faculty of Science of Kyoto University, and the appellee is an assistant professor of the Faculty of Science of Kyoto University.

The appellant and the appellee, jointly with others, had been engaged in research on experimental and theoretical analyses of brainwaves, and published various research papers and made presentations at conferences during the period between 1980 and 1982.

In this case, the appellant claimed to be a joint holder of copyrights for manuscripts of these research papers and conference presentations, and on this premise, alleged that the papers published by the appellee in scientific journals in his/her name alone or in the names of joint researchers excluding the appellant constitute reproduction or adaptation of the abovementioned research papers, etc. and hence they infringe the abovementioned copyrights held by the appellant. Based on these allegations, the appellant sought against the appellee payment of solatium and publication of an apology.

The court of prior instance determined that the appellant held copyrights jointly with others for the manuscripts of the research papers and conference presentations in question, but did not find infringement of the appellant's copyrights, and in conclusion, it dismissed all of the appellant's claims. Dissatisfied with this, the appellant filed an appeal with the high court.

2. Court decision

In this judgment, the court dismissed the appeal, holding that the form of copyright infringement alleged by the appellant is in itself irrelevant, on the following grounds.

- The research papers, etc. which the appellant allege to be copyrightable works express thoughts in a creative manner and are therefore copyrightable as academic documents, and were jointly authored by the appellant, the appellee, etc.

- However, in this action, the appellant alleged copyright infringement with regard to the appellee's act of explaining how to solve the proposition disclosed in said research papers, etc., not with regard to the unique style of expression.

- In general, the purpose of publications concerning science is to transmit practical knowledge contained therein to the general public and to provide other scholars with opportunities to further expand the knowledge. If such act of expanding knowledge constitutes copyright infringement, the aforementioned purpose would not be achieved. In the field of mathematics, which is one of the scientific academic areas, the aforementioned interpretation would prevent scholars from further developing knowledge based on the process of solving a proposition including how to expand an equation expressed in the published work. The process of solving a proposition can be considered to be the very thought (idea) expressed in the published work. If the style of expressing the process of solving a proposition is considered to be creative, it is possible to seek copyright protection for the creative expression. However, it should be interpreted that the process of solving a proposition itself cannot be regarded as a copyrighted work under the Copyright Act.

- Accordingly, the copyright holder of a work concerning mathematics cannot obtain copyright protection for the process of solving a proposition presented therein and the equation used to explain the process.

- The appellee's papers cannot be considered to have infringed the copyrights jointly owned by the appellant and the appellee and others. On these grounds, the claims made by the appellant in this action are groundless. The judgment in prior instance that dismissed the claims in this action is justifiable.

Judgment rendered on February 25, 1994
1990 (Ne) 2615

Judgment

Indication of the parties is omitted

Main text
This appeal shall be dismissed.
The appeal costs shall be borne by the appellant.

Facts
No. 1 Petition

The appellant sought a judgment that "The judgment in prior instance shall be revoked.

The appellee shall pay the appellant five million yen and delay damages accrued thereon at a rate of 5% per annum from October 24, 1985 until the date of full payment.

The appellee shall, for the appellant, publish the apology presented in Attachment 1 of the judgment in prior instance in the newspapers presented therein on the conditions specified therein.

The appellee shall, for the appellant, publish the apology presented in Attachment 2 of the judgment in prior instance in each of the magazines presented therein on the conditions specified therein.

The appellee shall, for the appellant, publish the apology presented in Attachment 3 of the judgment in prior instance in the magazine presented therein on the conditions specified therein."

The appellee sought a court decision to dismiss the appeal.

(omitted)

Reasons
1. The statuses of the appellant and the appellee and their joint research are stated in the section titled "No. 1 Parties concerned and the joint research of the plaintiff and the defendant" (from line 3 of the back of page 20 to the last line of the back of page 22). The phrase "it is unreasonable to interpret that it is jointly owned by a total of five people including the plaintiff and the defendant" shall be changed to "it was achieved by

a total of five people including the appellant and the appellee."

2. The style and content of Documents (i) to (xi) are as shown in paragraphs (1) and (2) (from line 1 of the face of page 23 to line 7 of the back of page 28), which are included in the section titled "No. 2 Style and content of Documents (i) to (xi) and their copyrightability" in the section titled "Reasons" in the judgment in prior instance.

3. There is a consensus among the parties concerned about the fact that Papers I and II were publicized (from line 1 of the face of page 7 to line 3 of the back of said page of the judgment in prior instance). According to Exhibits Ko 1 and 2, which are undisputed by the parties concerned, it is found that Papers I and II are written in English. The circumstances under which Papers I and II were published are explained in Section 2 (from line 8 of the face of page 31 to line 9 of the back of page 32) starting from the face of page 31 of the judgment in prior instance.

4. It is reasonable to interpret that the copyright holder of a work concerning mathematics cannot obtain copyright protection for the process of solving a proposition presented therein and the equation used to explain the process. In general, the purpose of publications concerning science is to transmit practical knowledge contained therein to the general public and to provide other scholars with opportunities to further expand the knowledge. If such act of expanding knowledge constitutes copyright infringement, the aforementioned purpose would not be achieved. In the field of mathematics, which is one of the scientific academic areas, the aforementioned interpretation would prevent scholars from further developing knowledge based on the process of solving a proposition including how to expand an equation expressed in the published work. The process of solving a proposition can be considered to be the very idea expressed in the published work. If the style of expressing the process of solving a proposition is considered to be creative, it is possible to seek copyright protection for the creative expression. However, it should be interpreted that the process of solving a proposition itself cannot be regarded as a copyrighted work under the Copyright Act.

There is no doubt that Documents (i) to (xi) express ideas in a creative manner and are therefore copyrightable as academic documents, and were jointly authored by the appellant, the appellee, etc. However, in this action, the appellant alleged copyright infringement of Documents (i) to (xi) ultimately with regard to the appellee's act of explaining, in Papers I and II, how to solve the proposition, "it is possible to develop a well-known differential equation from the Wilson and Cowan model and greatly contribute to solving brainwave phenomena," which was disclosed in Documents (i) to (xi) as the outcomes of joint research of Group A, as a major proposition examined in Papers I and II or as a premise for the major proposition by separating cases involving

and not involving spatial interaction. It is clear from such allegations of the appellant that the appellant alleged the copyright infringement with regard to the process of solving a proposition, not with regard to the unique style of expression.

5. A comparison between Papers I and II and Documents (i) to (xi) in terms of the styles of expressions used therein has revealed that Paper I is different from Documents (i) to (xi) in terms of the structure and expressions as pointed out from line 11 of the back of page 32 to line 3 of the back of page 37 of the judgment in prior instance and that Paper II is different from Documents (i) to (xi) (excluding Document (ix)) in terms of the structure and expressions as pointed out from line 1 of the face of page 38 to line 6 of the face of page 41 of the judgment in prior instance (the phrase "these (omitted) have not been proved" shown in lines 2 to 3 of the back of page 40 shall be replaced with the phrase "these documents do not contain any statement concerning proof for the reduction procedure"). The details and the expressions presented in Papers I and II are the same as those mentioned in the aforecited holding of the judgment in prior instance.

The holding of the judgment in prior instance is re-stated below.

Paper I examined only two components from the perspective of interaction of excitatory and inhibitory neural populations and derived a coupled van der Pol equation from the expanded Wilson and Cowan model and conducted a mathematical analysis of the interaction between the two coupled oscillator systems. On the other hand, Documents (i) to (xi), Documents (ii), (v), (vi), and (ix), which explain the process of solving the proposition, merely provide a rough explanation of the process of deriving some simplified van der Pol equations primarily from the Wilson and Cowan model consisting of a single component without space distribution. In other words, Paper I dealt with the propositions developed from the propositions presented in Documents (i) to (xi), i.e., different propositions from those examined in those documents.

Paper II focused on an integrodifferential equation of the Wilson and Cowan model, which took into consideration the interaction of the multiple excitatory and inhibitory neural populations distributed in space, and introduced an independent variable for the purpose of simplification and derived a diffusion term to reduce it to a van der Pol equation such as a FitzHugh-Nagumo equation. On the other hand, statements contained in Documents (i) to (xi) as to how to derive a van der Pol equation from the Wilson and Cowan model explain that a van der Pol equation can be derived by simplifying the Wilson and Cowan model without space distribution, i.e., a differential equation, through "Taylor expansion." Therefore, it can be said that Paper II is different from Documents (i) to (xi) in terms of the proposition at issue.

6. The following is the only identical expression.

The section titled "Abstract" at the beginning of Paper II contains the conclusion to the effect that "Several simplified differential equations are derived from the Wilson and Cowan model describing the dynamics of excitatory and inhibitory neurons." On the other hand, from line 4 of the main text of Document (ix), it is stated that "we derived several simplified differential equations from the Wilson and Cowan model of the dynamics of excitatory and inhibitory neurons."

In this respect, it can be said that both documents contain an almost identical statement. A further examination needs to be made in consideration of the limitations of copyright protection for published works concerning mathematics mentioned above. A comparison between Paper II and Document (ix) in accordance with the attachment to this judgment (the procedure stated in Paper II) revealed the following.

First, the main purpose of Paper II is to focus on the integrodifferential equation of the Wilson and Cowan model, which takes into consideration the interaction of the excitatory and inhibitory multiple neural populations distributed in space, and to introduce an independent variable for the purpose of simplification and derive a diffusion term to reduce it to a van der Pol equation such as a FitzHugh-Nagumo equation (Paragraph (5) starting from the back of page 40 of the judgment in prior instance cited above).

Paper II stated the aforementioned process of derivation as follows:

A. Stating Wilson and Cowan Equations (1) to (4) with space distribution;

B. Indicating two methods as means of simplification:

B-(a). First simplification (Simplification of the convolution integral) --- Introducing a new variable with a changed scale, Z, as Formula (17) and rewriting the convolution integral and approximating it by using Formula (19) in the form of differential through a Taylor expansion;

B-(b). Second simplification --- Carrying out a Taylor expansion for the sigmoid function to make Formula (22), which is the same as the one presented in Document (ii);

C. Approximating the simplified Formulas (19) and (22) and transforming Formulas (1) to (4) to reaction-diffusion partial differential equations, i.e., Formulas (23) to (27); and

D. Finally, deriving Formula (30) and (31), which are mathematical equivalents to the FitzHugh-Nagumo equations.

On the other, Document (ix):

a. states Wilson and Cowan Equation (1) with space distribution;

b. contains statements, "the Taylor series expansion of the convolution of Formula (1) will make a diffusion term through approximation of lowest orders" and "when the

activity level is low, the S-shaped function can be expanded around the threshold of neural populations";

c. states Formula (2), which is a simplified diffusion-type differential equation (equivalent to a FitzHugh-Nagumo equation) and explains that "in the case of neural populations distributed in space (in other words, in the case where $\lambda = 0$), Equation (2) would be reduced to FitzHugh's BVP model."

A comparison between Paper II and Document (ix) has revealed that:

(1) There seems to be a difference between A. and a. in terms of the manner of stating the Wilson and Cowan equations with space distribution. However, those formulas can be considered to be identical in substance, i.e., both are expressed in the integrodifferential equation including a partial differential term of first order;

(2) the final FitzHugh-Nagumo equations stated in D. and c. are expressed in the identical formula; and

(3) As stated in B. above, for the purpose of simplification of Wilson and Cowan equations, Formula (17) was introduced in order to introduce a new variable. On the other hand, b. only presents a simple statement and fails to present any specific mathematical formula.

Regarding Formula (17), Witness [B] (prior instance, a professor of Faculty of Science and Technology, Ryukoku University) stated that it is a mere scale transformation and that such transformation was unnecessary to reach the final Nagumo model. Witness [C] (prior instance, a professor of Faculty of Economics, Osaka University) stated that the formula does not only transform the scale but also transforms the position of the origin and that it is possible to derive Formula (19) for the diffusion term by differential approximation through Taylor expansion via Formula (18).

According to either testimony provided by the aforementioned two witnesses, the aforementioned comparison has revealed that it is undeniable that Paper II and Document (ix) use and express some identical equations and also partially share propositions stated therein. However, Paper II and Document (ix) share expressions only in the section cited above (the beginning of "Abstract" of Paper II). These shared parts merely present the shared proposition by using a not particularly creative expression. Furthermore, since equations are not copyrightable, the commonalities between the equations for which a comparison was made as above cannot be considered to constitute copyright infringement. Therefore, the aforementioned statement made in Paper II cannot be regarded as a reproduction or adaptation of Document (ix) and cannot constitute copyright infringement.

7. Exhibit Ko 49-2 (a written opinion prepared by Professor D of Nagoya University)

evaluated some major documents among Documents (i) to (xi) as follows.

Document (ii) can be summarized as stating that Van Der Pol Equation (7) can be derived from the Wilson and Cowan neuron model by approximation through series expansion.

Document (v) can be summarized as stating that Van Der Pol Equation (4) can be derived from Wilson and Cowan Neuron Model (1) without spatial interaction.

Document (viii) can be summarized as stating that a FitzHugh-Nagumo equation can be derived from the Wilson and Cowan neuron model with spatial interaction under certain conditions.

Document (ix) can be summarized as stating that the Wilson and Cowan model can be reduced to a simpler differential equation, in other words, to a reaction-diffusion type equation, FitzHugh-Nagumo type equation, etc. under certain assumptions, and as discussing the issue of stability of those approximate solutions.

The significance of these documents lies in deriving simpler, more easily dealt with equation systems from the neural population models, in other words, indicating that a van der Pol equation can be derived from the Wilson and Cowan model if no special interaction is involved and that, if special interaction is involved, the Wilson and Cowan model can be reduced to a reaction-diffusion type equation, FitzHugh-Nagumo type equation, BVP type equation, or van der Pol type equation under certain assumptions.

In light of Exhibit Ko 50 (a conceptual diagram prepared by Professor D), the interpretation of said professor can be summarized to the effect that Documents (ii), (v), (viii), and (ix) indicate that a van der Pol equation or FitzHugh-Nagumo equation can be derived from the Wilson and Cowan's original equation, regardless of whether space interaction is involved or not, through the process of (1) sigmoid function selection, (2) series expansion, or (3) removal of unnecessary terms. In sum, if space interaction is not involved, it will be finally reduced to a van der Pol equation, and, if space interaction is involved, it will be finally reduced to a FitzHugh-Nagumo equation. These ideas are said to have been expressed, although briefly, in Document (v) as final ideas.

The appellee has been arguing that the aforementioned documents cannot be interpreted as above. To support the argument, the appellee submitted Exhibit Otsu 73 (a written opinion prepared by Professor E of School of Engineering Science, Osaka University). It is impossible to make a prompt decision because this issue must be examined based on a good understanding of a highly advanced mathematical equation. Even if it is possible to adopt the interpretation presented by Professor Yomo, Papers I and II are at least different from Documents (i) to (xi) in terms of the propositions dealt with therein as mentioned in 5 above and it cannot be said that those papers and

documents share copyrightable expressions. Therefore, Papers I and II cannot be considered to infringe the copyrights for Documents (i) to (xi).

8. In this lawsuit, copyright infringement of those documents was alleged as an internal issue among those who had jointly conducted research until the publication of Documents (i) to (xi). Therefore, it can be said that this issue could be argued from the perspective of the liability for non-performance based on the premise that an implicit agreement was made with regard to the publication of the research outcomes before the publication of those documents. However, according to the appellant's allegation that "This is not a dispute among strangers over copyrights. This is a case where a joint researcher independently published a work based on the research outcomes obtained in the past by adding some related information. (omitted) Under the Copyright Act, any part of the outcomes of joint research cannot be disclosed to the public without the consent of all of the joint researchers. This is a view widely adopted by researchers in general as well (page 14 of the brief dated February 21, 1991 for this instance). Therefore, the appellant's claim in this action was made based on infringement of right under the Copyright Act. There is no allegation or proof for the existence of the aforementioned implicit agreement, and all of the evidence submitted in this case cannot prove the existence of such agreement either.

The appellant alleged that the basic parts essential for the appellee's papers are the same as Documents (i) to (xi) and that the appellee's attempt to independently obtain public recognition for the aforementioned research breakthroughs constitutes an act of tort, i.e., taking all the credit at the expense of others (the aforementioned Additional Allegation 2 (2) of the appellant). The appellee alleged that the appellant does not have priority for the propositions solved in Papers I and II and that the appellee did not steal the appellant's idea (paragraph 3 from the back of page 17 of the judgment in prior instance). The aforementioned allegation of the appellant can be interpreted to be stating the indirect circumstances surrounding the copyright infringement alleged in this action (in the prior instance, the appellant also clarified that the appellant did not seek a court decision as to the establishment of priority over the idea itself. Please refer to the brief dated June 21, 1989). Even if the issue of the liability for an act of tort has been raised based on infringement of a different right, it is generally impossible to interpret that the priority over an academic theory or academic idea is protected as a right. Thus, there are no grounds for requesting payment of damages for infringement of such right.

9. Therefore, Papers I and II can be considered to have infringed neither the copyrights jointly owned by the appellant and the appellee nor the moral rights of author such as the right of attribution. On these grounds, the claims made by the appellant in this action

are groundless.

Thus, the judgment in prior instance that dismissed the claims in this action is justifiable. Therefore, this appeal shall be considered groundless and dismissed. Article 95 and Article 89 of the Code of Civil Procedure shall apply to the payment of appeal costs. In conclusion, the judgment has been rendered in the form of the main text.

Osaka High Court

Judges: USHIO Hisaro, YAMAZAKI Takashi, SHIOTSUKI Shuhei

Attachment (omitted)