CLAIMS

[Claim 1]

An analysis system comprising:

a plurality of light-emitting points of which positions are fixed, and at which a plurality of types of light emitters emit lights;

a sensor that detects the lights emitted from the plurality of light-emitting points in a plurality of types of wavelength bands; and

a computer that processes detection signals of the sensor,

wherein the computer reduces spatial crosstalk and spectral crosstalk present between the signal intensities of the plurality of light-emitting points in the plurality of types of wavelength bands by an arithmetic operation collectively using all the signal intensities of the plurality of light-emitting points in the plurality of types of wavelength bands, and derives concentration of each of the plurality of types of light emitters at each of the plurality of light-emitting points.

[Claim 2]

An analysis system comprising:

a plurality of light-emitting points of which positions

are fixed, and at which one or more types of light emitters emit lights;

a sensor that detects the lights emitted from the plurality of light-emitting points in one or more types of wavelength bands; and

a computer that processes detection signals of the sensor,

wherein the computer reduces spatial crosstalk present between the signal intensities of the plurality of light-emitting points in the one or more types of wavelength bands by an arithmetic operation collectively using all the signal intensities of the plurality of light-emitting points in the one or more types of wavelength bands, and derives concentration of each of the one or more types of light emitters at each of the plurality of light-emitting points.

[Claim 3]

The analysis system according to claim 1, wherein

when the concentration of any of the plurality of types of light emitters at any of the plurality of light-emitting points changes with time, the computer derives a

time series of the concentration of each of the plurality of types of light emitters at each of the plurality of light-emitting points by performing the arithmetic operation at each time collectively using all the signal intensities in the plurality of types of wavelength bands for each of the plurality of light-emitting points obtained at each time.

[Claim 4]

An analysis system comprising:

C types (C is an integer of 1 or more) of fluorophores D(a, c) (c = 1, 2, ..., and C) which emit fluorescences from each of A (A is an integer of 2 or more) light-emitting points P(a) (a = 1, 2, ..., and A);

a sensor that detects the fluorescences from each of the A light-emitting points P(a) in detection regions W(a, b) (b = 1, 2, ..., and B) of B types (B is an integer of 1 or more) of wavelength bands; and

a computer that processes detection signals of the sensor,

wherein when signal intensities of the detection regions W(a, b) at any time are X(a, b) and concentrations of the fluorophores D(a, c) at any time are Z(a, c), the computer derives the concentrations Z(a, c) for all combinations of a and c from the signal intensities X(a, b)

for all combinations of a and b by executing a predetermined calculation formula at any time, and reduces spatial crosstalk and spectral crosstalk.

[Claim 5]

The analysis system according to claim 4, wherein

when a matrix X of (A × B) rows and 1 column having X(a, b) as elements is represented by the following Equation 1,

[Equation 1]

$$X = \begin{pmatrix} X(1,1) \\ \vdots \\ X(1,B) \\ X(2,1) \\ \vdots \\ X(A,B) \end{pmatrix}$$

,

a matrix Z of (A × C) rows and 1 column having Z(a, c) as elements is represented by the following Equation 2,

[Equation 2]

$$Z = \begin{pmatrix} Z(1,1) \\ \vdots \\ Z(1,C) \\ Z(2,1) \\ \vdots \\ Z(A,C) \end{pmatrix}$$

, and

a matrix Y of (A × B) rows and (A × C) columns having Y(a, b)(a, c) as elements and satisfying a relationship of X = Y × Z is represented by the following Equation 3,

[Equation 3]

$$Y = \begin{pmatrix} Y(1,1)(1,1) & \cdots & Y(1,1)(1,C) & Y(1,1)(2,1) & \cdots & Y(1,1)(A,C) \\ \vdots & \ddots & \vdots & \vdots & \iddots & \vdots \\ Y(1,B)(1,1) & \cdots & Y(1,B)(1,C) & Y(1,B)(2,1) & \cdots & Y(1,B)(A,C) \\ Y(2,1)(1,1) & \cdots & Y(2,1)(1,C) & Y(2,1)(2,1) & \cdots & Y(2,1)(A,C) \\ \vdots & \iddots & \vdots & \vdots & \ddots & \vdots \\ Y(A,B)(1,1) & \cdots & Y(A,B)(1,C) & Y(A,B)(2,1) & \cdots & Y(A,B)(A,C) \end{pmatrix},$$

the computer obtains a general inverse matrix Y^- of (A × C) rows and (A × B) columns of the matrix Y in advance, and uses $Z = Y^- \times X$ or an equivalent equation as the calculation formula.

[Claim 6]

The analysis system according to claim 5, wherein

the computer determines the matrix Y by performing a step of acquiring all the elements X(a, b) of the matrix X in a state in which only one element Z(a, c) of the matrix Z is a positive value and the other elements of the matrix Z are regarded as zero and using values proportional to the acquired elements X(a, b) as the elements Y(a, b)(a, c) of one corresponding column of the matrix Y, for all the combinations of a and c of the matrix Z.

[Claim 7]

The analysis system according to claim 5, wherein

the computer uses the same matrices Y and Y^- when different analyses are performed at different timings.

[Claim 8]

The analysis system according to any one of claims 4 to 7, further comprising:

A capillaries in which the A light-emitting points are provided; and

a light source that irradiates the A capillaries with a laser beam,

wherein the A light-emitting points are irradiated with the laser beam, and a sample labeled with the C types of fluorophores pass through each of the A light-emitting points P(a) by electrophoresis inside each of the A capillaries, when the C types of fluorophores are excited by the laser beam to emit the fluorescences.

[Claim 9]

An analysis system comprising:

a plurality of light-emitting points of which positions are fixed, and at which a plurality of types of fluorophores emit fluorescences;

a sensor that detects the fluorescences from the plurality of light-emitting points in a plurality of types of wavelength bands; and

a computer that processes detection signals of the sensor,

wherein the computer executes processing of causing a

state in which one type of fluorophore emits the fluorescence alone at one light-emitting point for all combinations of one of the plurality of light-emitting points and one of the plurality of types of fluorophores at different times.

[Claim 10]

The analysis system according to claim 9, wherein

the computer reduces spatial crosstalk and spectral crosstalk present between the signal intensities of the plurality of light-emitting points in the plurality of types of wavelength bands by an arithmetic operation using the signal intensities of the plurality of light-emitting points in the plurality of types of wavelength bands and information obtained by the processing, and derives concentration of each of the plurality of types of fluorophores at each of the plurality of light-emitting points.

[Claim 11]

An analysis system comprising:

C types (C is an integer of 1 or more) of fluorophores D(a, c) (c = 1, 2, ..., and C) which emit fluorescences from each of A (A is an integer of 2 or more) light-emitting points P(a) (a = 1, 2, ..., and A);

a sensor that detects the fluorescences from the A light-emitting points P(a) in detection regions W(a, b) (b = 1,

2, ..., and B) of B types (B is an integer of 1 or more) of wavelength bands; and

a computer that processes detection signals of the sensor,

wherein the computer executes processing of causing a state in which one type of fluorophore D(a, c) emits the fluorescence alone at one light-emitting point P(a) for all combinations of a and c at different times.

[Claim 12]

The analysis system according to claim 11, wherein

when signal intensities of the detection regions W(a, b) at any time are X(a, b) and concentrations of the fluorophores D(a, c) at any time are Z(a, c), the computer reduces spatial crosstalk and spectral crosstalk at any time for all the A light-emitting points P(a) by an arithmetic operation using the signal intensities X(a, b) for all combinations of a and b and information obtained by the processing, and derives the concentrations Z(a, c).

[Claim 13]

An analysis system comprising:

a plurality of light-emitting points of which positions are fixed, and at which light emitters emit lights;

a sensor that detects the lights emitted from the plurality of light-emitting points; and

a computer that processes detection signals of the sensor,

wherein the computer reduces spatial crosstalk present between the plurality of light-emitting points by an arithmetic operation collectively using all the signal intensities for each of the plurality of light-emitting points, and derives concentration of each of the light emitters at each of the plurality of light-emitting points.

[Claim 14]

The analysis system according to claim 13, wherein

when the concentration of any of the light emitters at any of the plurality of light-emitting points changes with time, the computer derives a time series of the concentration of each of the light emitters at each of the plurality of light-emitting points by performing the arithmetic operation at each time collectively using all the signal intensities for each of the plurality of light-emitting points obtained at each time.

[Claim 15]

An analysis method comprising:

preparing a plurality of light-emitting points of which positions are fixed, and at which a plurality of types of

fluorophores emit fluorescences;

detecting, by a sensor, the fluorescences from the plurality of light-emitting points in a plurality of types of wavelength bands; and

processing, by a computer, detection signals of the sensor,

wherein the computer executes an operation of causing a state in which one type of fluorophore emits the fluorescence alone at one light-emitting point for all combinations of one of the plurality of light-emitting points and one of the plurality of types of fluorophores at different times.

[Claim 16]

The analysis method according to claim 15, wherein

the processing includes

reducing spatial crosstalk and spectral crosstalk present between signal intensities of the plurality of light-emitting points in the plurality of types of wavelength bands by an arithmetic operation using the signal intensities of the plurality of light-emitting points in the plurality of types of wavelength bands and information obtained by executing the operation, and

deriving concentration of each of the plurality of types of fluorophores at each of the plurality of light-emitting points.

[Claim 17]

An analysis method comprising:

preparing C types (C is an integer of 1 or more) of fluorophores D(a, c) (c = 1, 2, ..., and C) which emit fluorescences from each of A (A is an integer of 2 or more) light-emitting points P(a) (a = 1, 2, ..., and A);

detecting, by a sensor, the fluorescences from each of the A light-emitting points P(a) in detection regions W(a, b) (b = 1, 2, ..., and B) of B types (B is an integer of 1 or more) of wavelength bands; and

processing, by a computer, detection signals of the sensor,

wherein the computer executes an operation of causing a state in which one type of fluorophore D(a, c) emits the fluorescence alone at one light-emitting point P(a) for all combinations of a and c at different times.

[Claim 18]

The analysis method according to claim 17, wherein

when signal intensities of the detection regions W(a, b) at any time are X(a, b) and concentrations of the fluorophores D(a, c) at any time are Z(a, c),

the processing includes

reducing spatial crosstalk and spectral crosstalk at any time for all the A light-emitting points P(a) by an

arithmetic operation using the signal intensities X(a, b) for all combinations of a and b and information obtained by executing the operation, and

deriving the concentrations Z(a, c).