Claims

[Claim 1]

A position detection system comprising:

a distance measuring sensor mounted to a vehicle traveling along a track, and capable of measuring a distance over a predetermined range in a track width direction;

an edge position detection unit that detects a position of an edge of a traveling path or a track floor in the track width direction of the track, based on distance measurement data obtained by the distance measuring sensor; and

a distance calculation unit that calculates a distance in the track width direction between a reference position of the track, which is specified from the position of the edge, and a reference position of the vehicle to which the distance measuring sensor is mounted,

wherein the edge is an intersection line at which two faces facing in different directions of surfaces of a structure configuring the track intersect each other.

[Claim 2]

The position detection system according to claim 1, wherein the distance calculation unit specifies the reference position of the track, based on positions of two or more edges which are at the same position in a vertical direction.

[Claim 3]

The position detection system according to claim 1 or 2, wherein the distance measuring sensor is mounted on a front side of a wheel in a vehicle traveling direction.

[Claim 4]

The position detection system according to claim 3, wherein the distance measuring sensor is mounted within a distance range in which an interval between the distance measuring sensor and the wheel in the vehicle traveling direction is smaller than at least a diameter of the wheel.

[Claim 5]

The position detection system according to any one of claims 1 to 4, wherein the distance measuring sensor is mounted such that both ends of a traveling path laid along the track are included in the predetermined range.

[Claim 6]

The position detection system according to claim 5, wherein the distance measuring sensor is mounted such that a center position of the distance measuring sensor is within a range in a width direction of a wheel that rotates and moves on an upper surface of the traveling path.

[Claim 7]

The position detection system according to any one of claims 1 to 5, wherein the distance measuring sensor is mounted to a center position in a vehicle body width direction of the vehicle.

[Claim 8]

The position detection system according to claim 7, wherein the distance measuring sensor is mounted such that upper surfaces of two traveling paths laid along the track and disposed side by side in the track width direction are included in the predetermined range.

[Claim 9]

The position detection system according to claim 7, wherein the distance measuring sensor is mounted such that both ends of a protrusion portion that is laid along the track and comes into contact with a ground shoe of the vehicle are included in the predetermined range.

[Claim 10]

The position detection system according to any one of claims 1 to 5, wherein the distance measuring sensor is mounted to each of both ends in the vehicle body width direction of the vehicle.

[Claim 11]

The position detection system according to any one of claims 1 to 10, wherein the distance measuring sensor includes an intersection line between each

of side walls laid at both ends of the track and a track floor in the predetermined range.

[Claim 12]

The position detection system according to any one of claims 1 to 5, wherein the distance measuring sensor is mounted so as to include an index part provided on the track as a target of distance measurement by the distance measuring sensor.

[Claim 13]

The position detection system according to any one of claims 1 to 12, wherein the distance measuring sensor irradiates detection light in a plurality of directions from a irradiation source within the predetermined range.

[Claim 14]

The position detection system according to claim 13, wherein the distance measuring sensor is mounted such that a surface of the track, which is not irradiated with the detection light due to the detection light being shielded, is created.

[Claim 15]

The position detection system according to claim 13 or 14, wherein the edge position detection unit specifies a portion in which a distance from the distance measuring sensor to an irradiation spot changes discontinuously with respect to scanning with the detection light in the plurality of directions, or a portion in which a slope of a distance changes discontinuously, as an edge position.

[Claim 16]

The position detection system according to any one of claims 1 to 15, further comprising:

a steering control unit that controls a steering mechanism of the vehicle such that the distance in the track width direction between the reference position of the track, which is specified from the position of the edge, and the reference position of the vehicle to which the distance measuring sensor is mounted becomes small.

[Claim 17]

The position detection system according to any one of claims 1 to 16, further comprising:

a cover surrounding the distance measuring sensor and having a bottom surface that is open.

[Claim 18]

A vehicle comprising:

the position detection system according to any one of claims 1 to 17.

[Claim 19]

A position detection method comprising:

a step of detecting a position of an edge of a traveling path or a track floor in a track width direction of a track, based on distance measurement data obtained by a distance measuring sensor mounted to a vehicle traveling along the track and capable of measuring a distance over a predetermined range in the track width direction; and

a step of calculating a distance in the track width direction between a reference position of the track, which is specified from the position of the edge, and a reference position of the vehicle to which the distance measuring sensor is mounted,

wherein the edge is an intersection line at which two faces facing in different directions of surfaces of a structure configuring the track intersect each other.