WHAT IS CLAIMED IS:

1. A method of correcting a film thickness measurement value in which a signal output from a sensor for measuring a film thickness of a polishing target object is corrected while a process of polishing the polishing target object is being performed, the polishing process including a first state where the sensor and the polishing target object do not face each other and a second state where the sensor and the polishing target object face each other, the method comprising:

obtaining a first measurement signal output from the sensor in the first state;

computing a correction value on the basis of the obtained first measurement signal and a reference signal set in advance with respect to the first measurement signal;

obtaining a second measurement signal output from the sensor in the second state; and

correcting the obtained second measurement signal on the basis of the computed correction value while the polishing process is being performed.

2. The method according to Claim 1, wherein the reference signal is a signal output from the sensor in a state where the sensor and the polishing target object do not face each other when the polishing process is not being performed.

3. The method according to Claim 1~~ or 2~~, wherein the polishing process includes polishing the polishing target object by pressing the polishing target object on a polishing pad for polishing the polishing target object while rotating a polishing table to which the polishing pad is attached,

the sensor is set in the polishing table,

the first state and the second state appear alternately with the rotation of the polishing table, and

correcting the second measurement signal is performed by correcting the second measurement signal obtained in the second state on the basis of a correction value computed on the basis of the first measurement signal obtained in the first state immediately before the second state and the reference signal.

4. The method according to ~~any one of~~ Claim~~s~~ 1~~ to 3~~, wherein the reference signal is a signal output from the sensor in a state where the sensor and the polishing target object do not face each other when calibration of the sensor is being performed.

5. The method according to ~~any one of~~ Claim~~s~~ 1~~ to 4~~, wherein the reference signal is a signal output from the sensor in a state where the sensor and the polishing target object do not face each other at an ambient temperature observed when the polishing process is not being performed.

6. The method according to ~~any one of~~ Claim~~s~~ 1~~ to 5~~, wherein the sensor is an eddy current sensor.

7. A film thickness corrector configured to correct a signal output from a sensor for measuring a film thickness of a polishing target object while a process of polishing the polishing target object is being performed, the polishing process including a first state where the sensor and the polishing target object do not face each other and a second state where the sensor and the polishing target object face

each other, the film thickness corrector comprising:

an acquisition section configured to obtain a first measurement signal output from the sensor in the first state and a second measurement signal output from the sensor in the second state;

a computation section configured to compute a correction value on the basis of the first measurement signal obtained by the acquisition section and a reference signal set in advance with respect to the first measurement signal; and

a correction section configured to correct the second measurement signal obtained by the acquisition section on the basis of the correction value computed by the computation section while the polishing process is being performed.

8. An eddy current sensor configured to measure a distance to a measurement target object or a film thickness of the measurement target object, the eddy current sensor comprising:

a sensor coil configured to generate an eddy current in the measurement target object, and detect an induced magnetic field derived from generation of the eddy current; and

an electrically conductive member disposed on the measurement target object side of the sensor coil.

9. The eddy current sensor according to Claim 8, wherein the electrically conductive member has an opposed portion opposed to the sensor coil.

10. The eddy current sensor according to Claim 9, wherein the electrically conductive member further has a peripheral

portion connected to the opposed portion and covering at least part of a periphery of the sensor coil.

11. The eddy current sensor according to ~~any one of~~ Claim~~s~~ 8~~ to 10~~, wherein the electrically conductive member is formed into a shape of a cap fitted around the sensor coil.

12. The eddy current sensor according to ~~any one of~~ Claim~~s~~ 8~~ to 11~~, wherein the electrically conductive member is formed by containing polypropylene and carbon kneaded in the polypropylene, a silicone resin, a synthetic resin with a vapor-deposited metal, glass with a vapor-deposited metal, rubber and carbon kneaded in the rubber, or a monocrystalline silicon substrate.

13. The eddy current sensor according to ~~any one of~~ Claim~~s~~ 8~~ to 12~~, wherein the electrically conductive member is formed by containing a material having an electrical resistivity of 1 Ω·cm to 100 Ω·cm.

14. The eddy current sensor according to ~~any one of~~ Claim~~s~~ 8~~ to 13~~, further comprising a magnetic shield sheet disposed between the sensor coil and the electrically conductive member and having an opening facing the sensor coil.

15. The eddy current sensor according to ~~any one of~~ Claim~~s~~ 8~~ to 14~~, wherein the eddy current sensor is an eddy current sensor for a polishing device, the eddy current sensor being provided in a hole formed in a polishing table to which a polishing pad for polishing a polishing target object is attached, the eddy current sensor being adapted to measure the distance to the polishing target object or the film thickness of the polishing target object,

wherein the sensor coil generates an eddy current in the polishing target object and detects an induced magnetic field derived from the generation of the eddy current, and

wherein the electrically conductive member is disposed on the polishing target object side of the sensor coil.

16. The eddy current sensor according to Claim 15, wherein the electrically conductive member is disposed between the sensor coil and the polishing pad.

17. The eddy current sensor according to Claim 15~~ or 16~~, wherein the electrically conductive member has an opposed portion opposed to the sensor coil and a peripheral portion connected to the opposed portion and facing an inner wall surface of the hole formed in the polishing table.