WHAT IS CLAIMED IS:

1. An eddy current sensor output signal processing circuit that processes first and second output signals output by an eddy current sensor including first and second coils that respectively output the first and second output signals, the output signal processing circuit comprising:

a first mixer circuit that accepts the first output signal and a signal of a predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication;

a first low-pass filter that accepts the output signal output by the first mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal;

a second mixer circuit that accepts the second output signal and the signal of the predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication;

a second low-pass filter that accepts the output signal output by the second mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal; and

a first subtractor circuit that accepts the DC signal output by the first low-pass filter and the DC signal output by the second low-pass filter as input, obtains a difference between the two input DC signals, and outputs the obtained difference,

wherein the output signal processing circuit includes a first adjustment circuit that accepts the DC signal output by the first low-pass filter as input, adjusts a magnitude of an amplitude of the input DC signal, and outputs an adjusted DC signal, and

the first subtractor circuit accepts the DC signal output by the first adjustment circuit and the DC signal output by the second low-pass filter as input, obtains a difference between the two input DC signals, and outputs the obtained difference.

2. An eddy current sensor output signal processing circuit that processes first and second output signals output by an eddy current sensor including first and second coils that respectively output the first and second output signals, the output signal processing circuit comprising:

a first mixer circuit that accepts the first output signal and a signal of a predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication;

a first low-pass filter that accepts the output signal output by the first mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal;

a second mixer circuit that accepts the second output signal and the signal of the predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication;

a second low-pass filter that accepts the output signal output by the second mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal; and

a first subtractor circuit that accepts the DC signal output by the first low-pass filter and the DC signal output by the second low-pass filter as input, obtains a difference between the two input DC signals, and outputs the obtained difference,

wherein the output signal processing circuit includes

a first adjustment circuit that accepts the DC signal output by the first low-pass filter as input, adjusts a magnitude of an amplitude of the input DC signal, and outputs an adjusted DC signal, and

a second adjustment circuit that accepts the DC signal output by the second low-pass filter as input, adjusts a magnitude of an amplitude of the input DC signal, and outputs an adjusted DC signal, and

the first subtractor circuit accepts the DC signal output by the first adjustment circuit and the DC signal output by the second adjustment circuit as input, obtains a

difference between the two input DC signals, and outputs the obtained difference.

3. An eddy current sensor output signal processing circuit that processes first and second output signals output by an eddy current sensor including first and second coils that respectively output the first and second output signals, the output signal processing circuit comprising:

a first mixer circuit that accepts the first output signal and a signal of a predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication;

a first low-pass filter that accepts the output signal output by the first mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal;

a second mixer circuit that accepts the second output signal and the signal of the predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication;

a second low-pass filter that accepts the output signal output by the second mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal; and

a first subtractor circuit that accepts the DC signal output by the first low-pass filter and the DC signal output by the second low-pass filter as input, obtains a difference between the two input DC signals, and outputs the obtained difference,

wherein the eddy current sensor includes third and fourth coils that respectively output third and fourth output signals, and

the output signal processing circuit includes

a third mixer circuit that accepts the third output signal and the signal of the predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication,

a third low-pass filter that accepts the output signal output by the third mixer circuit as input, cuts a high-frequency signal included in the output signal received as

input, and outputs at least a DC signal,

a fourth mixer circuit that accepts the fourth output signal and the signal of the predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication,

a fourth low-pass filter that accepts the output signal output by the fourth mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal,

a second subtractor circuit that accepts the DC signal output by the third low-pass filter and the DC signal output by the fourth low-pass filter as input, obtains a difference between the two input DC signals, and outputs the obtained difference, and

an adder circuit that accepts the difference output by the first subtractor circuit and the difference output by the second subtractor circuit as input, obtains a sum of the two input differences or a difference between the two input differences, and outputs the obtained sum or difference.

4. The eddy current sensor output signal processing circuit according to claim 1 or 2, wherein

the eddy current sensor includes third and fourth coils that respectively output third and fourth output signals, and

the output signal processing circuit includes

a third mixer circuit that accepts the third output signal and the signal of the predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication,

a third low-pass filter that accepts the output signal output by the third mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal,

a fourth mixer circuit that accepts the fourth output signal and the signal of the predetermined frequency as input, multiplies the two input signals, and outputs an output signal obtained by the multiplication,

a fourth low-pass filter that accepts the output signal output by the fourth mixer circuit as input, cuts a high-frequency signal included in the output signal received as input, and outputs at least a DC signal,

a second subtractor circuit that accepts the DC signal output by the third low-pass filter and the DC signal output by the fourth low-pass filter as input, obtains a difference between the two input DC signals, and outputs the obtained difference, and

an adder circuit that accepts the difference output by the first subtractor circuit and the difference output by the second subtractor circuit as input, obtains a sum of the two input differences or a difference between the two input differences, and outputs the obtained sum or difference.

5. A polishing apparatus comprising:

a polishing table to which a polishing pad for polishing a substrate is attached;

a driving unit configured to rotationally drive the polishing table;

a holding unit configured to hold the substrate and press the substrate against the polishing pad;

the eddy current sensor disposed inside the polishing table and configured to detect an eddy current formed in a conductive film formed on the substrate in association with the rotation of the polishing table;

the eddy current sensor output signal processing circuit according to any one of claims 1 to 4; and

an endpoint detection controller configured to compute film thickness data about the substrate from the output of the output signal processing circuit.