What is claimed is:

1. A polishing method comprising:

rotating a first film-thickness sensor and a second film-thickness sensor together with a polishing table, the first film-thickness sensor and the second film-thickness sensor being located at the same distance from a center of the polishing table;

polishing a surface of a substrate by pressing the substrate against a polishing pad on the rotating polishing table by a polishing head;

each time the polishing table makes one rotation during polishing of the substrate, causing the first film-thickness sensor to generate signal values indicating film thicknesses at first measurement points on the surface of the substrate, and causing the second film-thickness sensor to generate signal values indicating film thicknesses at second measurement points on the surface of the substrate, the first measurement points being located at different distances from a center of the substrate, the second measurement points being located at different distances from the center of the substrate, and the distances from the center of the substrate to the first measurement points being different from the distances from the center of the substrate to the second measurement points, timings of causing the first film-thickness sensor to generate the signal values and timings of causing the second film-thickness sensor to generate the signal values being determined based on a rotational speed of the polishing table and a rotational position of the polishing table; and

controlling polishing pressure applied from the polishing head to the substrate based on the signal values generated by the first film-thickness sensor and the second film-thickness sensor.

2. A polishing method comprising:

rotating a first film-thickness sensor and a second film-thickness sensor together with a polishing table, the first film-thickness sensor and the second film-thickness sensor

being located at the same distance from a center of the polishing table;

causing the first film-thickness sensor and the second film-thickness sensor to generate signal values indicating film thicknesses at measurement points on a surface of a substrate, while a polishing head is pressing the substrate against a polishing pad on the rotating polishing table, the measurement points being located at different distances from a center of the substrate; and

obtaining a signal value generated by the first film-thickness sensor at a first point in time in an N-th rotation of the polishing table;

obtaining a latest signal value generated by the second film-thickness sensor during the N-th rotation of the polishing table, and a previous signal value generated by the second film-thickness sensor during an N-1-th rotation of the polishing table; and

calculating an interpolated signal value from the latest signal value and the previous signal value, the interpolated signal value corresponding to a signal value of the second film-thickness sensor at the first point in time,

wherein controlling the polishing pressure applied from the polishing head to the substrate based on the signal values generated by the first film-thickness sensor and the second film-thickness sensor comprises controlling polishing pressure applied from the polishing head to the substrate based on the signal value generated by the first film-thickness sensor at the first point in time and the interpolated signal value.

3. The polishing method according to claim 2, wherein the interpolated signal value is a weighted average of the latest signal value and the previous signal value.

4. The polishing method according to claim 3, wherein the interpolated signal value is given by $WA=S2a \times ((360-\theta) / 360) + S2b \times (\theta / 360)$

where θ represents an angle between two lines extending from the center of the polishing table to the first film-thickness sensor and the second film-thickness sensor, S2a represents the latest signal value, S2b represents the previous signal value, and WA

represents the interpolated signal value.

5. The polishing method according to claim 2, further comprising:

producing a film-thickness profile using the signal value generated by the first film-thickness sensor and the interpolated signal value.

6. The polishing method according to claim 2, further comprising:

determining a polishing end point of the substrate based on the signal value generated by the first film-thickness sensor and the interpolated signal value.

7. The polishing method according to claim 6, wherein determining the polishing end point comprises terminating polishing of the substrate when one of the signal value generated by the first film-thickness sensor and the interpolated signal value reaches a target value.

8. The polishing method according to claim 6, wherein determining the polishing end point comprises terminating polishing of the substrate when one of a film thickness value, converted from the signal value of the first film-thickness sensor, and a film thickness value, converted from the interpolated signal value, reaches a target value.

9. A polishing apparatus comprising:

a polishing table for supporting a polishing pad;

a polishing head configured to press a substrate against the polishing pad to polish the substrate;

a first film-thickness sensor and a second film-thickness sensor arranged in the polishing table and located at the same distance from a center of the polishing table;

a sensor controller configured to transmit trigger signals to the first film-thickness sensor and the second film-thickness sensor to cause the first film-thickness

sensor and the second film-thickness sensor to generate signal values indicating film thicknesses at measurement points on a surface of the substrate, the measurement points being located at different distances from a center of the substrate; and

a data processor configured to receive the signal values from the first film-thickness sensor and the second film-thickness sensor and determine a target value of polishing pressure applied from the polishing head to the substrate,

wherein the sensor controller is configured cause the first film-thickness sensor to generate signal values indicating film thicknesses at first measurement points on the surface of the substrate each time the polishing table makes one rotation, and cause the second film-thickness sensor to generate signal values indicating film thicknesses at second measurement points on the surface of the substrate each time the polishing table makes one rotation, the first measurement points being located at different distances from the center of the substrate, the second measurement points being located at different distances from the center of the substrate, and the distances from the center of the substrate to the first measurement points being different from the distances from the center of the substrate to the second measurement points.

10. The polishing apparatus according to claim 9, further comprising:

a table rotational position detector configured to detect a rotational position of the polishing table,

wherein the sensor controller is configured to determine timings for transmitting the trigger signals to the first film-thickness sensor and the second film-thickness sensor based on a signal indicating the rotational position of the polishing table and a rotational speed of the polishing table, and to transmit the trigger signals to the first film-thickness sensor and the second film-thickness sensor with the determined timings to cause the first film-thickness sensor and the second film-thickness sensor to generate the signal values indicating film thicknesses at the measurement points on the surface of the substrate.

11. The polishing apparatus according to claim 9, further comprising:

an operation controller configured to control the polishing pressure applied from the polishing head to the substrate based on the target value of the polishing pressure.

12. A polishing apparatus comprising:

a polishing table for supporting a polishing pad;

a polishing head configured to press a substrate against the polishing pad to polish the substrate;

a first film-thickness sensor and a second film-thickness sensor arranged in the polishing table and located at the same distance from a center of the polishing table;

a sensor controller configured to transmit trigger signals to the first film-thickness sensor and the second film-thickness sensor to cause the first film-thickness sensor and the second film-thickness sensor to generate signal values indicating film thicknesses at measurement points on a surface of the substrate, the measurement points being located at different distances from a center of the substrate; and

a data processor configured to receive the signal values from the first film-thickness sensor and the second film-thickness sensor and determine a target value of polishing pressure applied from the polishing head to the substrate,

wherein the data processor is configured to:

obtain a signal value generated by the first film-thickness sensor at a first point in time in an N-th rotation of the polishing table;

obtain a latest signal value generated by the second film-thickness sensor during the N-th rotation of the polishing table, and a previous signal value generated by the second film-thickness sensor during an N-1-th rotation of the polishing table;

calculate an interpolated signal value from the latest signal value and the previous signal value, the interpolated signal value corresponding to a signal value of the second film-thickness sensor at the first point in time; and

determine the target value of the polishing pressure applied from the polishing

head to the substrate based on the signal value generated by the first film-thickness sensor at the first point in time and the interpolated signal value.

13. The polishing apparatus according to claim 12, wherein the data processor stores therein in advance a formula expressed as

$$WA=S2a \times ((360-\theta) / 360) + S2b \times (\theta / 360)$$

where θ represents an angle between two lines extending from the center of the polishing table to the first film-thickness sensor and the second film-thickness sensor, S2a represents the latest signal value, S2b represents the previous signal value, and WA represents the interpolated signal value.

14. The polishing apparatus according to claim 12, wherein the data processor is configured to produce a film-thickness profile using the signal value generated by the first film-thickness sensor and the interpolated signal value.

15. The polishing apparatus according to claim 12, wherein the data processor is configured to determine a polishing end point of the substrate based on the signal value generated by the first film-thickness sensor and the interpolated signal value.