What is claimed is:

1. A substrate processing apparatus for polishing a substrate by pressing the substrate against a polishing pad, the substrate processing apparatus comprising:

a polishing head defining a plurality of pressure chambers for pressing the substrate;

a pressure control unit configured to perform pressure feedback control by individually controlling pressures in the pressure chambers;

a film thickness measurement unit configured to measure a film thickness distribution of the substrate being polished;

a storage unit configured to store multiple pieces of information on a plurality of preset pressures of the pressure chambers; and

a response characteristic acquisition unit configured to change the preset pressure every time a predetermined condition is satisfied during polishing of the substrate, to measure a polishing rate applied to the substrate, to acquire a response characteristic of the polishing of the substrate, and store in the storage unit the acquired response characteristic corresponding to each of the preset pressure of the pressure chambers, wherein the response characteristic indicates responsiveness of the polishing of the substrate to the pressure feedback in the pressure chambers,

wherein the response characteristic acquisition unit is configured to measure the polishing rates by performing the

polishing on one substrate under the preset pressures in sequence.

2. The substrate processing apparatus according to claim 1, wherein the predetermined condition is that a certain period of time has elapsed or an amount of the polishing of the substrate has reached a predetermined amount.

3. The substrate processing apparatus according to claim 1, wherein a plurality of the preset pressures include a reference pressure condition including reference values for the pressure chambers and a plurality of preset pressure conditions obtained by changing only the pressure value in one pressure chamber from the reference pressure condition.

4. The substrate processing apparatus according to claim 3, wherein the response characteristic acquisition unit is configured to acquire a reference rate indicative of temporal change of a polishing rate on the basis of the reference pressure condition, perform standardization of the polishing rate that has been obtained by performing the polishing under the preset pressures in sequence, the standardization being performed on the basis of the reference rate, and thereby correct the polishing rate.

5. A non-transitory computer readable storage medium including an executable code causing a computer of a substrate processing

apparatus for polishing a substrate by pressing the substrate against a polishing pad to execute:

performing pressure feedback control by individually controlling pressures in a plurality of pressure chambers for pressing the substrate;

measuring film thickness distribution of the substrate being polished;

storing multiple pieces of information on a plurality of preset pressures of the pressure chambers;

measuring polishing rate applied to the substrate by changing the preset pressure every time a predetermined condition is satisfied during polishing of the substrate,

acquiring response characteristic of the polishing of the substrate, wherein the response characteristic indicates responsiveness of the polishing of the substrate to the pressure feedback in the pressure chambers, and

storing in the storage unit the acquired response characteristic corresponding to each of the preset pressure of the pressure chambers

wherein the response characteristic acquisition unit is configured to measure the polishing rates by performing the polishing on one substrate under the preset pressures in sequence.

6. The non-transitory computer readable storage medium according to claim 5, wherein the predetermined condition is that a certain period of time has elapsed or an amount of the polishing of the substrate has reached a predetermined amount.

7. The non-transitory computer readable storage medium according to claim 5, wherein a plurality of the preset pressures include a reference pressure condition including reference values for the pressure chambers and a plurality of preset pressure conditions obtained by changing only the pressure value in one pressure chamber from the reference pressure condition.

8. The non-transitory computer readable storage medium according to claim 7, wherein after a reference rate indicative of temporal change of a polishing rate on the basis of the reference pressure condition has been acquired, the polishing rate is corrected by standardization of the polishing rate that has been obtained by performing the polishing under the preset pressures in sequence, the standardization being performed on the basis of the reference rate.

9. A method of acquiring a response characteristic of polishing of a substrate in a substrate processing apparatus polishing the substrate by pressing the substrate against a polishing pad, the method comprising the steps of:

performing pressure feedback control by individually controlling pressures in a plurality of pressure chambers for pressing the substrate;

measuring a film thickness distribution of the substrate being polished;

storing multiple pieces of information on a plurality of preset pressures of the pressure chambers; and

changing the preset pressure every time a predetermined condition is satisfied during polishing of the substrate, measuring a polishing rate applied to the substrate, and acquiring the response characteristic of the polishing of the substrate, wherein the response characteristic indicates responsiveness of the polishing of the substrate to the pressure feedback in the pressure chambers, and

storing in the storage unit the acquired response characteristic corresponding to each of the preset pressure of the pressure chambers,

wherein the response characteristic acquisition unit is configured to measure the polishing rates by performing the polishing on one substrate under the preset pressures in sequence.