What is claimed is:

1. A method of determining a bearing radius of a coupling mechanism for tiltably coupling a rotating body to be pressed against a polishing pad to a drive shaft, including an upper spherical bearing having a first concave contact surface and a second convex contact surface which is in contact with the first concave contact surface, and a lower spherical bearing having a third concave contact surface and a fourth convex contact surface which is in contact with the third concave contact surface, the upper spherical bearing and the lower spherical bearing having a same rotational center, comprising:

determining a lower-bearing radius of the lower spherical bearing so that the a lower-restoring torque is equal to or less than 0,

wherein the lower-restoring torque is the sum of a rotating-body friction torque generated in the rotating body due to a rotating-body frictional force between the polishing pad and the rotating body, and a lower-bearing friction torque generated in the rotating body due to a lower-bearing frictional force, which is calculated when a point of application at which the rotating-body frictional force is applied to the lower spherical bearing is set at an outer end of the lower spherical bearing, between the third concave contact surface and the fourth convex contact surface, and

wherein, in a polar coordinate system with an origin located on the rotational center, the lower-restoring torque takes negative numbers when the rotating body attempts to tilt in a moving direction of the polishing pad.

2. The method of determining the bearing radius according to claim 1, wherein an upper-bearing radius of the upper spherical bearing is determined so that an upper-restoring torque is equal to or less than 0,

the upper-restoring torque is the sum of the rotating-body friction torque and an

upper-bearing friction torque generated in the rotating body due to an upper-bearing frictional force, which is calculated when a point of application at which the rotating-body frictional force is applied to the upper spherical bearing is set at an outer end of the upper spherical bearing, between the first concave contact surface and the second convex contact surface, and

wherein, in the polar coordinate system, the upper-restoring torque takes negative numbers when the rotating body attempts to tilt in a moving direction of the polishing pad.

3. A substrate polishing apparatus, comprising:

a polishing table for supporting a polishing pad;

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

a coupling mechanism for tiltably coupling the polishing head, which is a rotating body, to a drive shaft,

wherein the coupling mechanism includes an upper spherical bearing and a lower spherical bearing which are disposed between the drive shaft and the polishing head;

the upper spherical bearing has a first concave contact surface and a second convex contact surface which is in contact with the first concave contact surface;

the lower spherical bearing has a third concave contact surface and a fourth convex contact surface which is in contact with the third concave contact surface;

the first concave contact surface and the second convex contact surface are located above the third concave contact surface and the fourth convex contact surface; and

the first concave contact surface, the second convex contact surface, the third concave contact surface, and the fourth convex contact surface are arranged concentrically, having a same rotational center; and

wherein a lower-bearing radius of the lower spherical bearing is determined using the method according to claim 1.

4. The substrate polishing apparatus according to claim 3, wherein an upper-bearing radius of the upper spherical bearing is determined so that an upper-restoring torque is equal to or less than 0 using the method according to claim 2.

5. A substrate polishing apparatus comprising:

a polishing table for supporting a polishing pad;

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

a dresser which is pressed against the polishing pad, and

a coupling mechanism for tiltably coupling the dresser, which is a rotating body, to a drive shaft,

wherein the coupling mechanism includes an upper spherical bearing and a lower spherical bearing which are disposed between the drive shaft and the dresser;

the upper spherical bearing has a first concave contact surface and a second convex contact surface which is in contact with the first concave contact surface;

the lower spherical bearing has a third concave contact surface and a fourth convex contact surface which is in contact with the third concave contact surface;

the first concave contact surface and the second convex contact surface are located above the third concave contact surface and the fourth convex contact surface; and

the first concave contact surface, the second convex contact surface, the third concave contact surface, and the fourth convex contact surface are arranged concentrically, having a same rotational center; and

wherein a lower-bearing radius of the lower spherical bearing is determined using the method according to claim 1.

6. The substrate polishing apparatus according to claim 5, wherein an upper-bearing radius of the upper spherical bearing is determined so that an upper-restoring torque is equal to or less than 0 using the method according to claim 2.