**Appendix**

1. Detailed equations were used for kinematic analysis of NDI

**Ax-table 1** shows the angular variations of the hip, knee and angle using the NDI optical tracking system, which are calculated by **Equations 1–9**.

|  |  |
| --- | --- |
| **Ax-table 1**: Motion analysis using NDI optical tracking system | |
| (a)Kinematic analysis for the hip section | |
|  | (1) |
|  | (2) |
|  | (3) |
| (b)Kinematic analysis for the knee section | |
|  | (4) |
|  | (5) |
|  | (6) |
| (c)Kinematic analysis for the ankle section | |
|  | (7) |
|  | (8) |
|  | (9) |

1. Detailed equations were used for kinematic analysis of IMU

As shown in **Ax-table 2,** the angular variations of the hip using the IMU tracking system can be calculated by **Equations 10–12**. The angular variations of the knee using the IMU tracking system can be calculated by **Equations 13–15**. The angular variations of the ankle using the IMU tracking system can be calculated by **Equations 16–18**.

|  |  |
| --- | --- |
| **Ax-table 2**: Motion analysis using IMU tracking system | |
| (a)Kinematic analysis for the hip section | |
|  | (10) |
|  | (11) |
|  | (12) |
| (b)Kinematic analysis for the knee section | |
|  | (13) |
|  | (14) |
|  | (15) |
| (c)Kinematic analysis for the ankle section | |
|  | (16) |
|  | (17) |
|  | (18) |