**Problem statement**

We have the initial position and velocity of the baseball at time . Once it reaches near the home-plate, we have accurate velocity of the baseball at time . Can we find the 9P model and are the 9P model parameters unique?

**Solution**

(1)

At , . Plug this in eq. (1), we get

(2)

Differentiating eq. (1) w.r.t. , we get

(3)

At , . Plug this in eq. (3), we get

(4)

At , . Plug this in eq. (3), we get

(5)

**Conclusion**

The 9P model parameters can be uniquely found in this system.

**Problem statement**

We have the initial position and velocity of the baseball at time . Once it reaches near the home-plate, we have accurate final position of the baseball at time . Can we find the 9P model and are the 9P model parameters unique?

**Solution**

(1)

At , . Plug this in eq. (1), we get

(2)

Differentiating eq. (1) w.r.t. , we get

(3)

At , . Plug this in eq. (3), we get

(4)

At , . Plug this in eq. (1), we get

(5)

**Conclusion**

The 9P model parameters can be uniquely found in this system.