What equations describe the mechanics of a golf swing?

Mathematics can answer this question and many others.

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\[ A\ddot{\theta} + B\dot{\phi}\cos(\phi - \theta) - B\dot{\theta}^2 \sin(\phi - \theta) = -\tau_v + \tau_h \]

\[ B\ddot{\phi}\cos(\phi - \theta) + B\dot{\phi}^2 \sin(\phi - \theta) + C\ddot{\theta} = -\tau_h \]

\[
 v_{ball} = v_{club} \left( \frac{1 + c_R}{m_{club}} \right) \frac{m_{club}}{m_{club} + m_{ball}}
\]