Position of the mass

Velocity of the mass

Kinetic energy

Potential energy

Lagrangian

Derivative calculation

w.r.t.

EOM for

w.r.t.

EOM for

w.r.t.

EOM for

w.r.t.

EOM for

Joint EOM

Control equation

SS representation

3 blades

Full non-linear

Small deflection approximation ( and )

Linearize around , so that and

Non-linear state space eqn.

Linearized state space eqn.