# Question #2

## Linear Discrete-time System Equations

If our time-step is small we can use Euler integration to approximate the state transition function which enables us to define the DT linear matrices as a function of the CT Jacobians found in Question #1. For the provided nominal state vector and input vector our DT linearized matrices are then:

|  |  |
| --- | --- |
|  | (2.1) |
| = | (2.2) |
|  | (2.3) |

Our system is not time-invariant because our matrices are a function of input and state and therefore the nominal point is different at each time step.