Model Documentation of the:

Boost Converter

1 Nomenclature

1.1 Nomenclature for Model Equations

U	Voltage
I	Current
L	Inductivity
C	Capacity
R	Electrical Resistance
U_{DC}	Input DC-Voltage
d	duty ratio

1.2 Nomenclature for Derivation

2 Model Equations

State Vector and Input Vector:

$$\underline{x} = (x_1\ x_2)^T = (I\ U)^T$$
$$\underline{u} = u_1 = d$$

Model Equations:

$$\dot{x}_1 = -(1-u_1)\frac{1}{L}x_2 + \frac{U_{DC}}{L} \tag{1a}$$
$$\dot{x}_2 = (1-u_1)\frac{1}{C}x_1 - \frac{1}{RC}x_2 \tag{1b}$$

Parameters: R, C, L, U_{DC}
Outputs: U

2.1 Assumptions

2.2 Exemplary parameter values

Parameter	Symbol	Value

3 Derivation and Explanation

References

[1] K. Roebenack: *Nichtlineare Regelungssysteme*, Springer Vieweg, p. 8-9, 2017