Introduction

Note: Displacement or velocity observations (e.g., from proximity sensor or vibrometer) can be represented by:

$$\mathbf{y} = \mathbf{C}^{\mathbf{T}}\mathbf{u}$$

where:

$$\mathbf{C}^{\mathbf{T}} = [\mathbf{1}, \mathbf{0}] \text{ or } \mathbf{C}^{\mathbf{T}} = [\mathbf{0}, \mathbf{1}]$$

x

Real World Embedded Model

$$\tau = (\mathbf{u}, \mathbf{v}, \mathbf{s}, \theta)$$

$$k = \text{const}$$

$$c(T) = \exp\left(\frac{T_0}{T} - 1\right)$$

$$\dot{T} = c(T)\dot{x}^2 - \frac{T - T_0}{t_T}$$

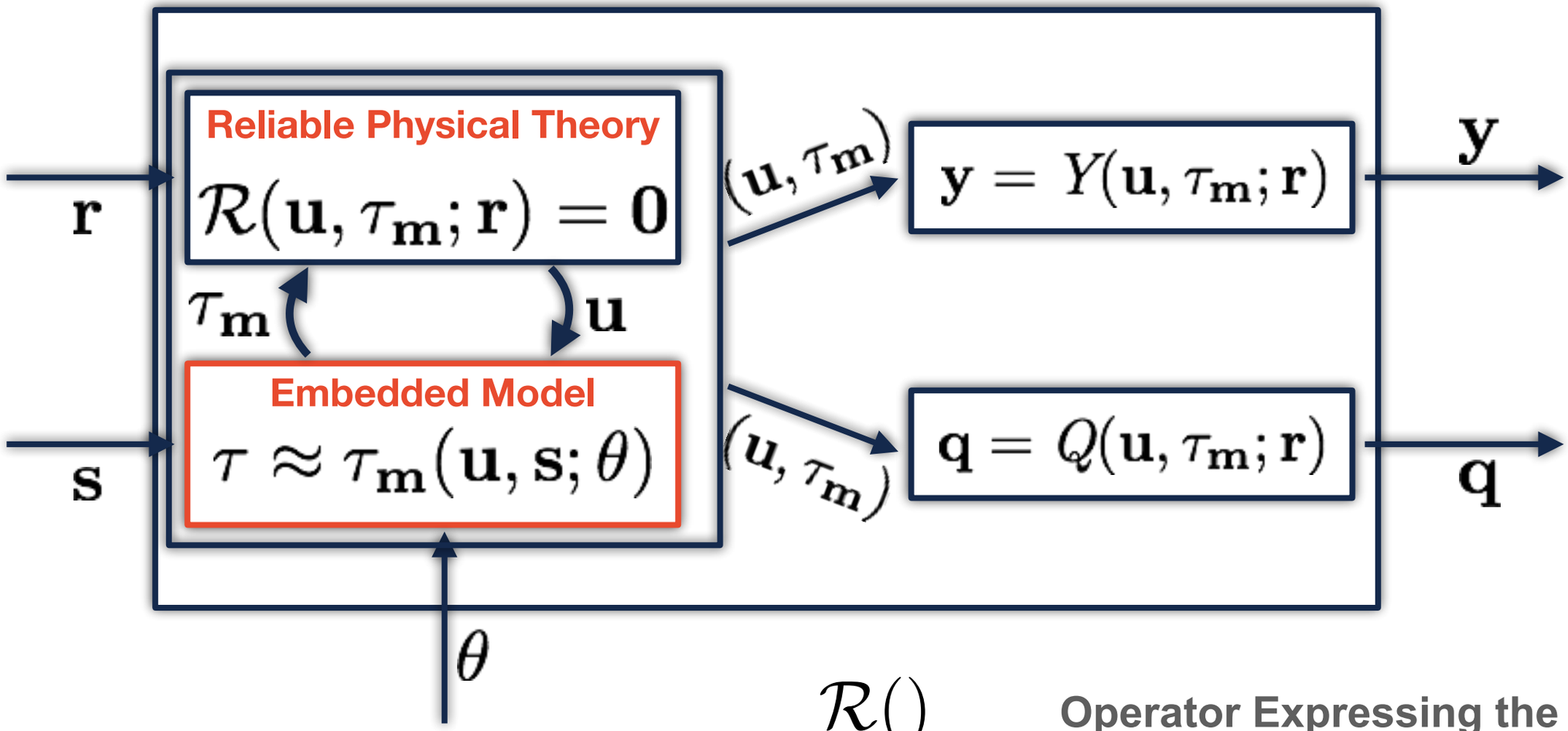
$$\mathbf{v} = T \qquad \mathbf{s} = \begin{bmatrix} T_0 \\ t_T \end{bmatrix} \qquad \theta = k$$

$$\mathbf{y} = x$$

$$\mathbf{q} = \max(\dot{x})$$

Introduction

If τ where known in terms of $(\mathbf{u}, \mathbf{r})$, the system would be closed. However, it is often the case that the required relationship between τ and $(\mathbf{u}, \mathbf{r})$ is unknown or does not exist.



τ

$\mathcal{R}()$	Operator Expressing the Theory
$\mathbf{u}$	State Variable
$\tau_\mathbf{m}$	Closure Variables
θ	Parameters of the Embedded Model
$\mathbf{r} \cup \mathbf{s} = \mathbf{x}$	Input for the Scenario