* **HW\_4\_1**. Consider

1. Find the equilibrium point
2. Using linearization, at the equilibrium point, check the stability.
3. Find a Lyapunov function using variable gradient method. –End -

* **HW\_4.2** Consider the minimal problem( static optimal problem)

Assume . Find

subject to .

Then prove that the minimum value is -End-

* **HW\_4.3(Laselle’s Theorem)**

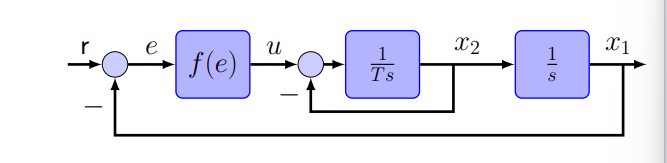
Consider

Select

1. What is the equilibrium points?
2. Using the equilibrium point is stable or asym.stable?
3. Find the invariant set
4. What is the largest invariant set ?
5. Using the Laselle’s theorem, is it asymp.stable?

* HW\_4.3 : Exercize 3.15 (pp.85)
* HW\_4.4: Exercize 3.20 (pp.85)
* HW\_4.5

Consider the following feedback system



The state space model is,

where

Choose a Lyapunov candidate as

1. Is it stable?
2. If r = step function, plot the

3.1) when

3.2) when

3.3) when

-The End-