本試題是否可以使用計算機： □可使用 ， ☑不可使用 （請命題老師勾選）

Answer the following questions. (5 points each)

1. What are the major advantages and disadvantages of open-loop system?

2. For a dynamic equation described as $\dot{x}(t) = Ax(t) + Bu$ and $y(t) = Cx(t)$, please derive the transfer function of the system.

3. What is the meaning of Jordan canonical form matrix?

4. How to express the relative stability of a system?

5. Show two common nonlinearities encountered in control system, and plot their input-output relationship..

6. What are the meanings of backlash and deadzone?

7. What is the meaning of principle of argument?

8. What are the major advantages and disadvantages of digital controller?

9. Show the definitions of controllability and obsevability.

10. What's the definition of the time constant of a system?

11. Show a RC phase-lag network for phase-lag compensation.

12. Show a RC phase-lead network for phase-lead compensation.

13. Show the effects and limitations of phase-lag compensation.

14. Show the effects and limitations of phase-lead compensation.

15. Brief explaination of the Variable Structure System (VSS) control.

16. What is the meaning of generalized eigenvectors? Show the procedure to find generalized eigenvectors.

17. The system input is u(t), and the system impulse response is $G(t-\tau)$, then the system output y(t) can be described as following,

$y(t) = \int_0^t G(t-\tau)u(\tau)d\tau$. This system must be (a) linear system (b) Relaxed system (c) causal system (d) Time invariant system. Muliple choice!

18. Why the state feedback will not change system's controllability and may change its observability?

19. Show the distinct eigenvalues associated eigenvectors are linearly independent.

20. Write the procedure to check the system's stability.