

**Report** **of Homework**

**Linear Control System**

Professor: Kyoung Kwan Ahn

Student ID: 20175312

Name: Pham Thanh Tuan

**A-P-7.** Obtain the response of the following system:

where is the uni-step input occuring at , or .

**Solution:**

From the system, we have:

The state transition matrix is given by

Since

We have:

The response of the system is given by

When and , we obtain:

Hence, the response can be obtain as follow:

**A-P-14.** Using Sylvester’s interpolation formula, compute , where

**Solution:**

The characteristic polynomial is given by

Note that and . We have:

Where and are determined from the equation as follows:

Inserting and into these equations gives:

Solving for and , we obtain:

Hence,

**B-9-6.** Consider the following matrix A:

Compute by three methods.

**Solution:**

**Method 1.**

The characteristic polynomial is given by

The eigenvalues of A are -1 and -2 (). A necessary tranformation matrix S may be obtained as

Then it can be seen that

is obtanted as follows:

**Method 2.**

We have:

Hence,

**Method 3.**

We have:

The eigenvalues of A are -1 and -2 (). We get:

Expanding the determinant, we obtain:

**B-9-8.** Find and of the system described by:

where the initial conditions are

**Solution:**

From the system, we have:

The state transition matrix is given by

Since

We have:

The response of the system is given by

When and B = , we obtain:

Hence,