**Example which shows that the system with two generators is not always stable.**

We will explore the system with the following parameters:

Where the system is:

Where:

,

First, let's find the system equilibrium points:

As we shoed, the system equilibrium points must satisfy:

**1. We will start with:**

We will find with the cubic equation from page 12 at the notes:

Where

Solving this equation give the following solution:

The only real solution gives

We will calculate with the dynamics of the third line:

We will calculate with the dynamics of the second line:

In order to validate those results, let's calculate

This is MATLAB numerical error.

**2. Now, :**

We will get the same results as at the previous section, but with

Solving:

Gives:

Now,

In order to validate those results, let's calculate

This is MATLAB numerical error.

Now we will calculate the Jacobian of this system:

Where:

We will substitute our parameters and our equilibrium points into and calculate (numerically) its eigenvalues:

**For :**

We get:

This shows that this equilibrium point is not stable.

**For :**

We get:

This shows that this equilibrium point is not stable.

We will show simulation of system with these parameters set which starts from arbitrary initial point:



