

Lesson 7. A Model for the National Economy

- In this lesson, we will build a model for the national economy that describes the relationship between
 - total national income
 - consumer expenditures
 - private investment
 - government expenditures

- Variables:

- Equations:

- Total national income is the sum of consumer expenditures, private investment, and government expenditures:

- Consumption occurs one time period after it is earned:

- ◊ The constant m is called the **marginal propensity to consume (MPC)**

- Private investment is proportional to the change in consumption:

- ◊ The constant ℓ is called the **accelerator**

- ◊ Consumption $\uparrow \Rightarrow$ More factories needed to supply goods \Rightarrow Investment \uparrow

- Government expenditures are constant (and normalized to 1 unit of money):

- We can eliminate all variables except T_n as follows:

- So, we can write the above model for the national economy as a second order linear DS:

Example 1. Consider the model for the national economy with $m = \frac{2}{3}$ and $\ell = \frac{1}{4}$.

- Write the second order linear DS equation.
- Find the general solution to this DS. (See the previous lesson.)

c. Suppose $C_0 = 3$ and $I_0 = 2$. Find the initial conditions for the second order linear DS you wrote in part a.

d. Find the particular solution that satisfies the IC you found in c.

e. Find the national income after 10 time units.

f. Find the national income in the long run.