Mathematics
Module III – Dynamic analysis (12 hours course, *plus* 4 hours tutorial)
Prof. Michele Longo

1. *Ordinary Differential Equations* (SHSS: 5.1-8, 6.1-9, 7.1-4; SB: 24.1-6, 25.1-5)
   1.1. General theory.
   1.2. First order ODEs.
   1.3. Constant coefficients linear ODEs.
   1.4. Two-dimensional linear systems with constant coefficients.
   1.5. Two-dimensional autonomous systems.

2. *Difference Equations* (SHSS: 11.1-5, 11.7; SB: 23.2)
   1.1. General theory.
   1.2. First order DEs.
   1.3. Constant coefficients linear DEs.
   1.4. Two-dimensional linear systems with constant coefficients.

3. *Deterministic Optimal Control* (SHSS: 9.1-4, 9.6-7, 9.9, 10.1-2)
   3.1. Continuous-time deterministic control problems.
   3.2. One state and one control variable.
   3.3. Several state and several control variables.
   3.4. Sufficient conditions.
   3.5. Discounting and current values.

References

- Carl P. SIMON and Lawrence BLUME (SB), *Mathematics for Economists*. W.W. Norton & Company, 1994.
- Knut SYDSAETER, Peter HAMMOND, Atle SEIERSTAD, Arne STROM (SHSS), *Further Mathematics for Economic Analysis*, Prentice Hall, 2005.