Dynamic Systems

Isaac Ayala Lozano

1 Signals & Systems

1.1 What is a system?

A system is defined as a grouping of elements to be analysed together. They can be categorised as linear or non-linear, depending on the equations used to describe them. Linear systems are considered to be idealised systems, whilst non-linear systems are those representing real-world conditions.

Systems can also be categorised based on the *order* of the differential equations. Some examples of categorised systems are shown in table 1.1.

	Linear	Non-Linear
1st order	RC circuit	Population growth
2nd order	Spring Mass Damper	Pendulum
3rd order		Chaotic Systems
...		
Nth order	Wave Equation	General Relativity

Table 1: Examples of linear and non-linear systems.