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## Introduction

The main contribution of this notebook is to translate the original

The following sections are as followed:

Section 2 we will be looking at how GSSA algorithm is constructed with python codes included

Section 3 we will be looking at the different Regression methods employed in the GSSA, with individual python codes

Section 4 will be the benchmarking results from different methods

Section 5 will be implementation of Country N

Section 5 conclusion

# Generalised Stochastic Simulation Algorithm

In this section, we will be looking at the mechanism of the GSSA. I will illustrate this via applying a neoclassical stochastic growth model with only one representative agent. Notice that GSSA is more than capable of solving multi-dimensional problem, which I will showcase a multi-country framework also purposed by Judd et.al (2011). Aside with the theoretical explanations of each steps, the corresponding codes will also shed more insights for the mechanisms.

## Representative Agent Model

Consider the following agent with a that faces intertemporal utility-maximisation problem:

$E\_{t}$ stands for the expectation operator for the information given at time $t$. $c\_{t}$, $k\_{t}$, $a\_{t}$ stands for consumption, capital, and productivity level respectively. $f(\dot)$ describes the production function. $\beta \in (0,1)$ denotes the discount factor; while $\delta \in (0,1]$ and $\rho \in (-1,1)$ represents depreciation of capital and autocorrelation coefficient of the productivity level. $\sigma \geq 0$ stands for the standard deviation of the productivity shock. Notice that at $t=0$ both $k$ and $a$ are given.

It is clear that equation $eqref{Euler equation}$ denotes the Euler equation, while equation

The GSSA algorithm can be illustrated via two main stages, which respectively are guessing the

# ill-conditioned problems

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