

# Notes for Optimal Growth using Dynamic Programming

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## 1 The Problem

A consumer has to maximize:

$$U(c) = \frac{c^{1-\gamma}}{1-\gamma} \quad (1)$$

Subject to:

$$c_{t+1} + k_{t+1} = zk^\alpha + (1-\delta)k \quad (2)$$

$$\log(z_{t+1}) = \log(z_t) + \eta_{t+1} \quad (3)$$

## 2 Solving

- Grid based method: We divide  $V$  (The value function) into subdomains - mostly into a multi dimensional grid, and approximate  $V$  with separate function within each subdomain. This is interpolation.
- The grid will be the Cartesian product  $G_k \times G_z$ , *that is all combination of four state and stochastic shocks (if the*