

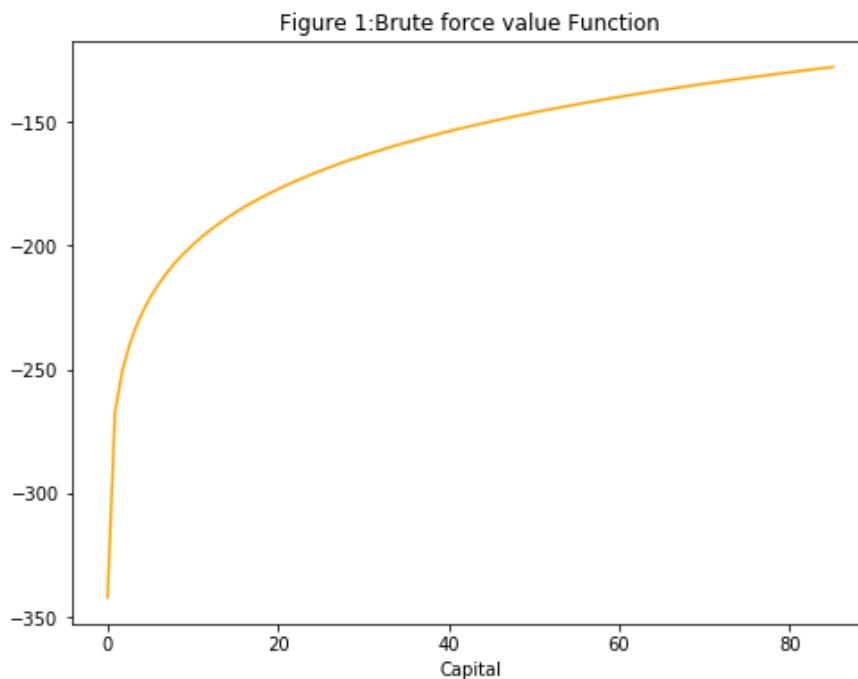
## Macroeconomics Homework 4

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### Question 1.1

All the value functions were evaluated with an initial  $v=0$ .

Brute force Value function graph:



Part	Value function conditions	Time	Time Improvements
a	Brute force	10.767	
b	Monotonicity	10.183	Including monotonicity improves the time but not drastically.
c	Concavity	3.706	Including concavity the value iteration has a strong improvement.
d	Local Search	4.040	Local search also shows a massive improvement compared to both brute force and monotonicity but takes longer than the case where, only concavity is included.
e	Monotonicity and Concavity	8.722	Including both monotonicity and concavity improves the time when compared to brute force. It seems it takes the average of both the conditions while evaluating the value function

Part	Value function conditions	Iterations
a	Brute force	99
b	Monotonicity	100
c	Concavity	39999
d	Local Search	40000
e	Monotonicity and Concavity	39999