

Operations Research: Models, Algorithms, and Implementations

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Preface

This is a Quarto book.

To learn more about Quarto books visit <https://quarto.org/docs/books>.

Part I

1

Inventory Management

Note

JIT Just In Time, JIT
 JIT
 Lean Manufacturing

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- 1.
- 2.

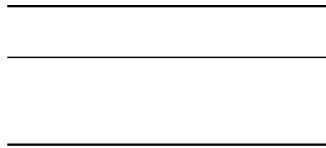
Scientific Inventory Management

- 1.
- 2.

1.1

demand	(Deterministic)	Stochastic	
review	(Continuous Review)	(Periodic Review)	1
lead time		0	0
backorder			
planning horizon	(Single Period)	(Multi Period)	(Infinite)

EOQ
Wagner-Whitin



1.2

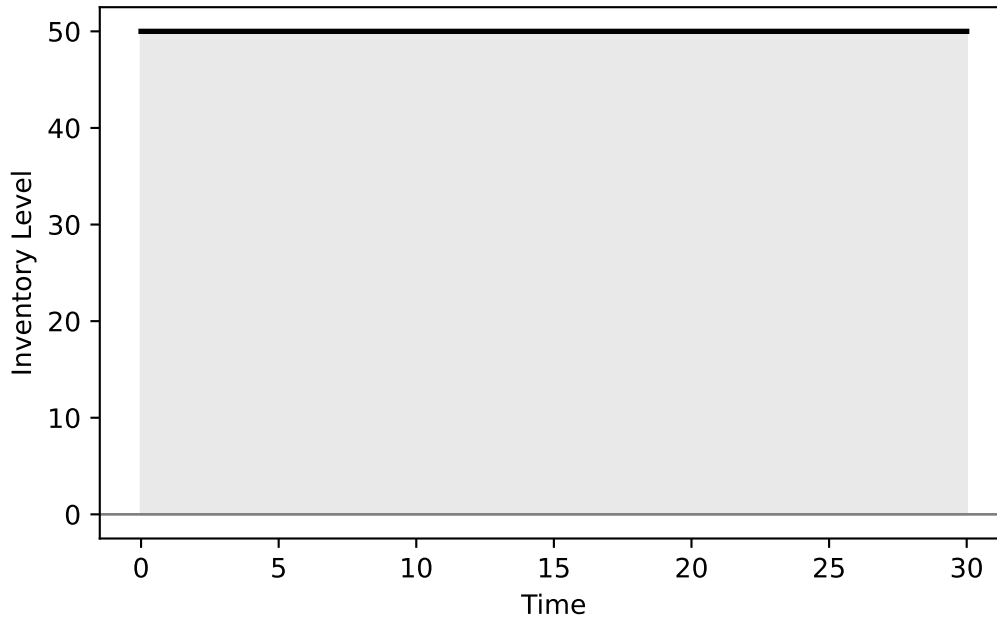
ordering cost	1	fixed cost	1	K
purchase cost		c		
stockout cost		p		
holding cost		1	h	

1	1	h	30	50	$30 \times 50 \times h = 1500h$
					$\times h = 1500h$

```
import matplotlib.pyplot as plt
import numpy as np

t = np.linspace(0, 30, 1000)
inventory = np.full_like(t, 50)

# Plotting the inventory level
plt.fill_between(t, inventory, color="lightgray", alpha=0.5, label="Inventory Level")
plt.plot(t, inventory, label="Inventory Level", color="black", linewidth=2)
plt.xlabel("Time")
plt.ylabel("Inventory Level")
plt.axhline(0, color="gray", linewidth=1)
plt.tight_layout()
plt.show()
```

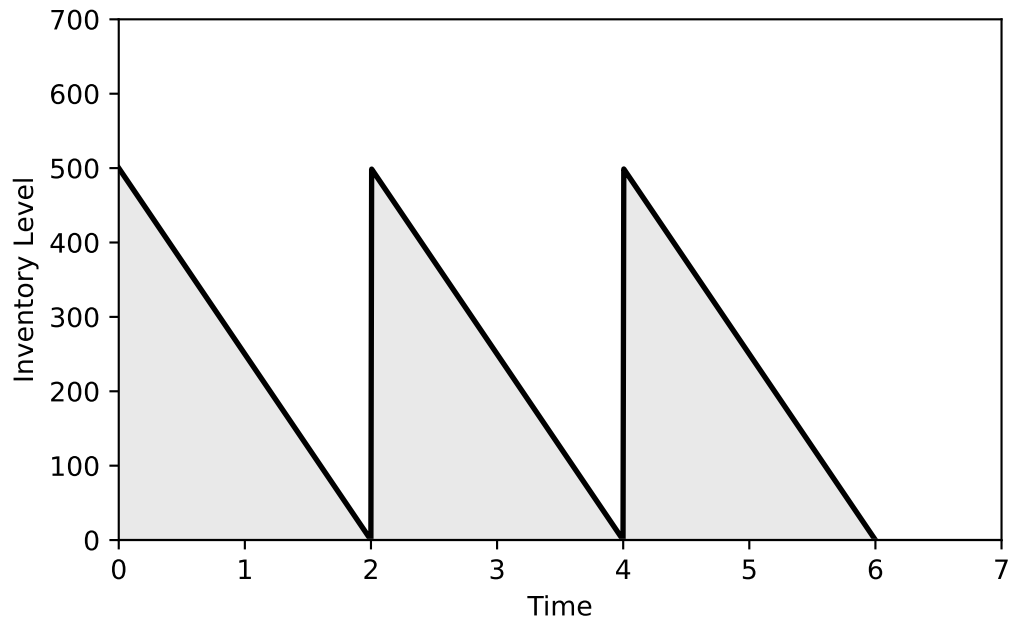


500 6

```
# Parameters
d = 250 # Demand rate
Q = 500 # Order quantity
T = Q / d # Cycle length
t = np.linspace(0, 2.999 * T, 1000)

# Inventory level over time
inventory = np.maximum(0, Q - (d * t) % Q)

# Plotting the inventory level
plt.fill_between(t, inventory, color="lightgray", alpha=0.5, label="Inventory Level")
plt.plot(t, inventory, label="Inventory Level", color="black", linewidth=2)
plt.xlabel("Time")
plt.ylabel("Inventory Level")
plt.axhline(0, color="gray", linewidth=1)
plt.ylim(bottom=0, top=Q + 200)
plt.xlim(0, 3.5 * T)
plt.tight_layout()
plt.show()
```



$$\frac{2 \times 500}{2} \times 3 \times h$$