Model 5

\( \sum_{i=1}^{n} f_j Q_j \leq f \)

Resource constraint:

Minimize \[ \sum_{j=1}^{n} \left[ \frac{\lambda_j A_j}{Q_j} + \frac{I_j Q_j}{2} \right] \]

subject to \( d_0 \)
Step 1
Compute $Q_{uw} = \left( \frac{2uA_j}{I_j} \right)^{\frac{1}{2}}$ \( j = 1, 2, \ldots, n \)

See if this is feasible.

If feasible, then optimal.

Optimum satisfies

$$\Sigma e_j Q_{j} = f$$
Step 2

Solve  

Minimise $K$

\[ \sum_{j=1}^{n} f_j Q_j = f \]  \hspace{1cm} (1)

Solve equations:

\[ \frac{\partial K}{\partial Q_j} = \Theta f_j, \quad j=1 \ldots n \]

\[ \Delta K \]

Normal\, \text{constraint}: \quad \phi > 0 \Rightarrow \text{reduce } K

\text{unknown} \quad \text{N+1 equation in } N+1 \text{ unknowns}
\[ Q_j = \left( \frac{2 \chi_j A_j}{I_j - 2\theta f_j} \right)^{\frac{1}{2}} \]

\[ \sum f_j = f \]

Solve for \( \Theta \), numerically.
Model 6

$N$ items.

Each individually looks like

Manufacture the items oneself.
Assume first that we produce in sequence 1, 2, ..., \( n \).

Given this cycle there is a total change-over cost \( A \).

Production times are \( \left( \frac{\lambda_1}{\psi_1} + \frac{\lambda_2}{\psi_2} + \cdots \right) T \).
Cost, given ordered products in

\[
\frac{A}{T} + \sum_{j=1}^{N} \frac{I_i}{2} \times q_j (1 - \frac{x_i}{q_j})
\]

Strategy: Find sequences

minimize \( J \) one \( T \)

and take best sequence.