# Important Airport Distribution Models Formulas PDF

Formulas
Examples
with Units

**List of 21**
**Important Airport Distribution Models Formulas**

## 1) Air Trip Distribution Models Formulas

### 1.1) Constant of Proportionality for greater Air Trip Distances Formula

Evaluate Formula

Formula

$$K_o = \frac{T_{ij}}{\left(T_j \cdot T_i\right)^P}$$

Example

$$1.5586 = \frac{5}{\left(20 \cdot 10\right)^{0.22}}$$

### 1.2) Constant of Proportionality given Travel by Air Passengers between Cities Formula

Evaluate Formula

Formula

$$K_o = \frac{T_{ij} \cdot C_{ij}^{\ x}}{T_j \cdot T_i}$$

Example

$$1.5016 = \frac{5 \cdot 7.75^{\ 2}}{20 \cdot 10}$$

### 1.3) Cost of Travel between i and j given Travel by Air Passengers between Cities Formula

Evaluate Formula

Formula

$$C_{ij} = \left(\frac{K_o \cdot T_j \cdot T_i}{T_{ij}}\right)^{\frac{1}{x}}$$

Example

$$7.746 = \left(\frac{1.5 \cdot 20 \cdot 10}{5}\right)^{\frac{1}{2}}$$

### 1.4) Distance between i and j given Travel by Air Passengers between Cities i and j Formula

Evaluate Formula

Formula

$$d_{ij} = \left(\frac{K_o \cdot P_i \cdot P_j}{T_{ij}}\right)^{\frac{1}{x}}$$

Example

$$16.9706 = \left(\frac{1.5 \cdot 60 \cdot 16}{5}\right)^{\frac{1}{2}}$$

### 1.5) Population of destination city given travel by air passengers between cities Formula

Evaluate Formula

Formula

$$P_j = \frac{T_{ij} \cdot \left(d_{ij}^{\ x}\right)}{K_o \cdot P_i}$$

Example

$$16.0556 = \frac{5 \cdot \left(17^{\ 2}\right)}{1.5 \cdot 60}$$

## 1.6) Population of origin city given travel by air passengers between cities Formula

Evaluate Formula

Formula

$$P_i = \frac{T_{ij} \cdot \left( d_{ij}^{\ x} \right)}{K_o \cdot P_j}$$

Example

$$60.2083 = \frac{5 \cdot \left( 17^{\ 2} \right)}{1.5 \cdot 16}$$

## 1.7) Total Air Trips generated in City i for greater Air Trip Distances Formula

Evaluate Formula

Formula

$$T_i = \frac{\left( \frac{T_{ij}}{K_o} \right)^{\frac{1}{P}}}{T_j}$$

Example

$$11.904 = \frac{\left( \frac{5}{1.5} \right)^{\frac{1}{0.22}}}{20}$$

## 1.8) Total Air Trips generated in City i given Travel by Air Passengers between Cities Formula

Evaluate Formula

Formula

$$T_i = \frac{T_{ij} \cdot C_{ij}^{\ x}}{K_o \cdot T_j}$$

Example

$$10.0104 = \frac{5 \cdot 7.75^{\ 2}}{1.5 \cdot 20}$$

## 1.9) Total Air Trips generated in City j for greater Air Trip Distances Formula

Evaluate Formula

Formula

$$T_j = \frac{\left( \frac{T_{ij}}{K_o} \right)^{\frac{1}{P}}}{T_i}$$

Example

$$23.8079 = \frac{\left( \frac{5}{1.5} \right)^{\frac{1}{0.22}}}{10}$$

## 1.10) Total Air Trips generated in City j given Travel by Air Passengers between Cities Formula

Evaluate Formula

Formula

$$T_j = \frac{T_{ij} \cdot C_{ij}^{\ x}}{K_o \cdot T_i}$$

Example

$$20.0208 = \frac{5 \cdot 7.75^{\ 2}}{1.5 \cdot 10}$$

## 1.11) Travel by Air Passengers between Cities i and j Formula

Evaluate Formula

Formula

$$T_{ij} = \frac{K_o \cdot P_i \cdot P_j}{d_{ij}^{\ x}}$$

Example

$$4.9827 = \frac{1.5 \cdot 60 \cdot 16}{17^{\ 2}}$$

### 1.12) Travel by Air Passengers between Cities i and j for greater Air Trip Distances Formula

Evaluate Formula

Formula

$$T_{ij} = K_o \cdot \left( T_i \cdot T_j \right)^{P}$$

Example

$$4.8119 = 1.5 \cdot \left( 10 \cdot 20 \right)^{0.22}$$

### 1.13) Travel by Air Passengers between Cities i and j given Travel Cost Formula

Evaluate Formula

Formula

$$T_{ij} = \frac{K_o \cdot T_i \cdot T_j}{C_{ij}^{\ x}}$$

Example

$$4.9948 = \frac{1.5 \cdot 10 \cdot 20}{7.75^{\ 2}}$$

## 2) Generation-Distribution Models Formulas

### 2.1) Air Trips between i and j Formula

Evaluate Formula

Formula

$$F_{ij} = \left( P_i \cdot P_j \right) \cdot \left( x + \left( \beta \cdot t \right) + \left( Q_{ij} \right) \right)$$

Example

$$12105.6 = \left( 60 \cdot 16 \right) \cdot \left( 2 + \left( 0.1 \cdot 5.1 \right) + \left( 10.1 \right) \right)$$

### 2.2) Air Trips in Year y for Stated Purpose under Leisure Category Formula

Evaluate Formula

Formula

$$II = P_i \cdot \left( a + \left( b \cdot f_{yl} \right) \cdot \left( \frac{1}{1 + \left( K \cdot \left( \frac{F}{I} \right)^{q} \right)} \right) \right)$$

Example

$$323.8708 = 60 \cdot \left( 0.6 + \left( 0.8 \cdot 6 \right) \cdot \left( \frac{1}{1 + \left( 0.98 \cdot \left( \frac{32}{68} \right)^{10.2} \right)} \right) \right)$$

## 2.3) Country Pair Relation Index given Air Traffic between Stations i and j Formula

Evaluate Formula

Formula

$$\beta = \left( \frac{P_{ij}}{a_0 \cdot \left( \alpha \cdot GNP \right)^{b_0} \cdot \left( \alpha \cdot GNP \right)^{C} \cdot \left( F_e + A + \left( \frac{B}{F_e - C} \right) \right)} \right)^{\frac{1}{d}}$$

Example

$$0.4879 = \left( \frac{500}{10.5 \cdot \left( 5.5 \cdot 460 \right)^{0.01} \cdot \left( 5.5 \cdot 460 \right)^{0.2} \cdot \left( 10.15 + 0.5 + \left( \frac{0.3}{10.15 - 0.2} \right) \right)} \right)^{\frac{1}{0.21}}$$

## 2.4) Factor to adjust for Quantum Effects given Air Trips between i and j Formula

Evaluate Formula

Formula

$$Q_{ij} = \left( \frac{F_{ij}}{P_i \cdot P_j} \right) - x - \left( \beta \cdot t \right)$$

Example

$$9.99 = \left( \frac{12000}{60 \cdot 16} \right) - 2 - \left( 0.1 \cdot 5.1 \right)$$

## 2.5) Income for Leisure given Air Trips for Stated Purpose under Leisure Category Formula

Evaluate Formula

Formula

$$f_{yl} = \frac{\left( \frac{II}{P_i} \right) - a}{b \cdot \left( \frac{1}{1 + \left( K \cdot \left( \frac{F}{T} \right)^{q} \right)} \right)}$$

Example

$$6.0235 = \frac{\left( \frac{325}{60} \right) - 0.6}{0.8 \cdot \left( \frac{1}{1 + \left( 0.98 \cdot \left( \frac{32}{68} \right)^{10.2} \right)} \right)}$$

## 2.6) Population at i given Air Trips between i and j Formula

Evaluate Formula

Formula

$$P_i = \frac{F_{ij}}{\left( x + \left( \beta \cdot t \right) + \left( Q_{ij} \right) \right) \cdot P_j}$$

Example

$$59.4766 = \frac{12000}{\left( 2 + \left( 0.1 \cdot 5.1 \right) + \left( 10.1 \right) \right) \cdot 16}$$

## 2.7) Population at Origin given Air Trips in Year y for Stated Purpose under Leisure Category Formula

Evaluate Formula

Formula

$$P_i = \frac{II}{a + \left(b \cdot f_{yl}\right) \cdot \left(\frac{1}{1 + \left(K \cdot \left(\frac{F}{T}\right)^{q}\right)}\right)}$$

Example

$$60.2092 = \frac{325}{0.6 + \left(0.8 \cdot 6\right) \cdot \left(\frac{1}{1 + \left(0.98 \cdot \left(\frac{32}{68}\right)^{10.2}\right)}\right)}$$

## 2.8) Time in Years given Air Trips between i and j Formula

Evaluate Formula

Formula

$$t = \frac{\left(\frac{F_{ij}}{P_i \cdot P_j}\right) - x - Q_{ij}}{\beta}$$

Example

$$4 = \frac{\left(\frac{12000}{60 \cdot 16}\right) - 2 - 10.1}{0.1}$$

## Variables used in list of Airport Distribution Models Formulas above

- **a** Regression Contant a
- **A** Currency Scale Constant a
- $a_0$ Regression Coefficient a
- **b** Regression Contant b
- **B** Currency Scale Constant b
- $b_0$ Regression Coefficient b
- **C** Currency Scale Constant c
- $C_{ij}$ Cost of Travel between Cities
- **d** Regression Coefficient d
- $d_{ij}$ Distance between Cities
- **F** Mean Total Effective Fair
- $F_e$ Economy Fare
- $F_{ij}$ Air Trips between i and j
- $f_{yl}$ Income
- **GNP** Real Gross National Product
- **I** Mean Income of Households
- **II** Air Trips in Year y for stated Purpose
- **K** Constant Reflection Surface Route Saturation
- $K_o$ Proportionality Constant
- **P** Calibrated Parameter
- $P_i$ Population of Origin City
- $P_{ij}$ Air Passengers between Cities i and j
- $P_j$ Population of Destination City
- **q** Constant q
- $Q_{ij}$ Factor to Adjust for Quantum Effects
- **t** Number of Years
- $T_i$ Total Air Trips generated in City i
- $T_{ij}$ Travel by Air Passengers between Cities i and j
- $T_j$ Total Air Trips generated in City j
- **x** Calibrated Constant
- **α** Station Share of GNP
- **β** Country Pair Relation Index

## Download other Important Airport Planning and Design PDFs

- Important Aircraft Runway Length Estimation Formulas
- Important Airport Distribution Models Formulas
- Important Airport Forecast Methods Formulas
- Important Engine-Out Takeoff Case under Estimation of Runway Length Formulas

## Try our Unique Visual Calculators

- Percentage of number
- LCM calculator
- Simple fraction

Please SHARE this PDF with someone who needs it!

## This PDF can be downloaded in these languages

English Spanish French German Russian Italian Portuguese Polish Dutch

*7/9/2024 | 4:14:53 AM UTC*