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Airport Forecast Methods Formulas

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List of 20 Airport Forecast Methods Formulas

Airport Forecast Methods

Conventional Airport Forecast Methods

1) Domestic Passenger Enplanement

Open Calculator

fx $$EI_i = M_{i/j} \cdot M_{i/s} \cdot Ms_{/us} \cdot M_{US} \cdot E_{US}$$

ex $$40.32 = 56 \cdot 0.4 \cdot 0.3 \cdot 0.12 \cdot 50$$

2) Domestic Passenger Enplanement in Location i

Open Calculator

fx $$M_{i/j} = \frac{EI_i}{M_{i/s} \cdot Ms_{/us} \cdot M_{US} \cdot E_{US}}$$

ex $$55.55556 = \frac{40}{0.4 \cdot 0.3 \cdot 0.12 \cdot 50}$$

3) Percent Market Share for Airport

Open Calculator

fx $$M_{i/s} = \frac{EI_i}{M_{i/j} \cdot Ms_{/us} \cdot M_{US} \cdot E_{US}}$$

ex $$0.396825 = \frac{40}{56 \cdot 0.3 \cdot 0.12 \cdot 50}$$

4) Percent Market Share for Region 'j'

Open Calculator

fx $$\mathrm{Ms_{/us}} = \frac{\mathrm{EI_i}}{\mathrm{M_{i/j}} \cdot \mathrm{M_{i/s}} \cdot \mathrm{M_{US}} \cdot \mathrm{E_{US}}}$$

ex $$0.297619 = \frac{40}{56 \cdot 0.4 \cdot 0.12 \cdot 50}$$

5) Percent Market Share of State of total US Market

Open Calculator

fx $$\mathrm{M_{US}} = \frac{\mathrm{EI_i}}{\mathrm{M_{i/j}} \cdot \mathrm{M_{i/s}} \cdot \mathrm{Ms_{/us}} \cdot \mathrm{E_{US}}}$$

ex $$0.119048 = \frac{40}{56 \cdot 0.4 \cdot 0.3 \cdot 50}$$

6) Total Scheduled Domestic Passenger Enplanement

Open Calculator

fx $$\mathrm{E_{US}} = \frac{\mathrm{EI_i}}{\mathrm{M_{i/j}} \cdot \mathrm{M_{i/s}} \cdot \mathrm{Ms_{/us}} \cdot \mathrm{M_{US}}}$$

ex $$49.60317 = \frac{40}{56 \cdot 0.4 \cdot 0.3 \cdot 0.12}$$

Integrated Demand Forecast Framework

7) Air Transport Movement per Aircraft

Open Calculator

$$\mathrm{ATM} = \frac{\mathrm{Y} - \mathrm{a_0} - (\mathrm{JF} \cdot \mathrm{a_1}) - (\mathrm{W} \cdot \mathrm{a_2})}{\mathrm{a_3}}$$

$$99.95 = \frac{45010 - 10.5 - (1000 \cdot 4) - (5000 \cdot 8)}{10}$$

8) Airline Industry Wages

Open Calculator

$$\mathrm{W} = \frac{\mathrm{Y} - \mathrm{a_0} - (\mathrm{JF} \cdot \mathrm{a_1}) - (\mathrm{ATM} \cdot \mathrm{a_3})}{\mathrm{a_2}}$$

$$4999.938 = \frac{45010 - 10.5 - (1000 \cdot 4) - (100 \cdot 10)}{8}$$

9) Average Trip Length given Passenger Enplanements

Open Calculator

$$\mathrm{L} = \frac{\mathrm{RPM}}{\mathrm{EI_i}}$$

$$902.5002\mathrm{m} = \frac{36100.01}{40}$$

10) Jet Fuel Price given Yield

Open Calculator

$$JF = \frac{Y - a_0 - (W \cdot a_2) - (ATM \cdot a_3)}{a_1}$$

$$999.875 = \frac{45010 - 10.5 - (5000 \cdot 8) - (100 \cdot 10)}{4}$$

11) Passenger Enplanements

Open Calculator

$$EI_i = \frac{RPM}{L}$$

$$40.02218 = \frac{36100.01}{902m}$$

12) Real Gross National Product

Open Calculator

$$GNP = \frac{RPM - b_0 - (Y \cdot c)}{d}$$

$$438.0952 = \frac{36100.01 - 0.01 - (45010 \cdot 0.8)}{0.21}$$

13) Real Yield given Revenue Passenger Miles

Open Calculator

$$Y = \frac{RPM - b_0 - (GNP \cdot d)}{c}$$

$$45004.25 = \frac{36100.01 - 0.01 - (460 \cdot 0.21)}{0.8}$$

14) Regression Model Formulation for Yield

Open Calculator

$$Y = a_0 + (JF \cdot a_1) + (W \cdot a_2) + (ATM \cdot a_3)$$

$$45010.5 = 10.5 + (1000 \cdot 4) + (5000 \cdot 8) + (100 \cdot 10)$$

15) Revenue Passenger Miles

Open Calculator

$$RPM = b_0 + (GNP \cdot d) + (Y \cdot c)$$

$$36104.61 = 0.01 + (460 \cdot 0.21) + (45010 \cdot 0.8)$$

16) Revenue Passenger Miles given Passenger Enplanements

Open Calculator

$$RPM = EI_i \cdot L$$

$$36080 = 40 \cdot 902m$$

Multi-Airport Region Forecast Framework

17) Airline Service Weekly Departing Flights from Airport 1

Open Calculator

$$AS_1 = \left(\frac{\ln\left(\frac{P_1}{P_{23}}\right) - b_{1,2} \cdot (TT_1 - TT_{23})}{b_{2,3}} \right) + AS_{23}$$

$$4.853925h = \left(\frac{\ln\left(\frac{50.1}{55}\right) - 5h \cdot (6h - 6.5h)}{6.8h} \right) + 4.5h$$

18) Airline Service Weekly Departing Flights from Airport 2,3

Open Calculator

$$AS_{23} = -\left(\left(\frac{\ln\left(\frac{P_1}{P_{23}}\right) - b_{1,2}\cdot(TT_1 - TT_{23})}{b_{2,3}}\right) - AS_1\right)$$

ex $$3.746075\text{h} = -\left(\left(\frac{\ln\left(\frac{50.1}{55}\right) - 5\text{h}\cdot(6\text{h} - 6.5\text{h})}{6.8\text{h}}\right) - 4.1\text{h}\right)$$

19) Travel Times from Analysis Zone to Airports 1 given Percent of Passengers

Open Calculator

$$TT_1 = \left(\frac{\ln\left(\frac{P_1}{P_{23}}\right) - b_{2,3}\cdot(AS_1 - AS_{23})}{b_{1,2}}\right) + TT_{23}$$

ex $$7.025338\text{h} = \left(\frac{\ln\left(\frac{50.1}{55}\right) - 6.8\text{h}\cdot(4.1\text{h} - 4.5\text{h})}{5\text{h}}\right) + 6.5\text{h}$$

20) Travel Times from Analysis Zone to Airports 2,3

fx Open Calculator

$$TT_{23} = -\left(\left(\frac{\ln\left(\frac{P_1}{P_{23}}\right) - b_{2,3} \cdot (AS_1 - AS_{23})}{b_{1,2}}\right) - TT_1\right)$$

ex $$5.474662\text{h} = -\left(\left(\frac{\ln\left(\frac{50.1}{55}\right) - 6.8\text{h} \cdot (4.1\text{h} - 4.5\text{h})}{5\text{h}}\right) - 6\text{h}\right)$$

Variables Used

- a_0 Regression Coefficient a
- a_1 Regression Coefficient a1
- a_2 Regression Coefficient a2
- a_3 Regression Coefficient a3
- AS_1 Airline Service 1 *(Hour)*
- AS_{23} Airline Service 23 *(Hour)*
- **ATM** Air Transport Movement per Aircraft
- b_0 Regression Coefficient b
- $b_{1,2}$ Coefficient for Travel Time *(Hour)*
- $b_{2,3}$ Coefficient for Airline Service *(Hour)*
- **c** Regression Coefficient
- **d** Regression Coefficient d
- E_{US} Total Scheduled Domestic Passenger
- EI_i Domestic Passenger Enplanement
- **GNP** Real Gross National Product
- **JF** Jet Fuel Price
- **L** Average Trip Length *(Meter)*
- $M_{i/j}$ Domestic Passenger Enplanement in Location 'i'
- $M_{i/s}$ Percent Market Share for Airport 'i'
- M_{US} Percent Market Share of State
- $Ms_{/us}$ Percent Market Share for Region

- P_1 Percent of Passengers in Analysis Zone
- P_{23} Percent of Passengers in Analysis Zone 2,3
- **RPM** Revenue Passenger Miles
- TT_1 Travel Times from Analysis Zone 1 *(Hour)*
- TT_{23} Travel Times from Analysis Zone 2,3 *(Hour)*
- **W** Airline Industry Wages
- **Y** Yield of Aircraft

Constants, Functions, Measurements used

- Function: **ln**, ln(Number)
  Natural logarithm function (base e)
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Time** in Hour (h)
  Time Unit Conversion

Check other formula lists

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

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