

1-D gas models of air traffic at some major European airports

Data-driven modelling and validation of the inbound flow

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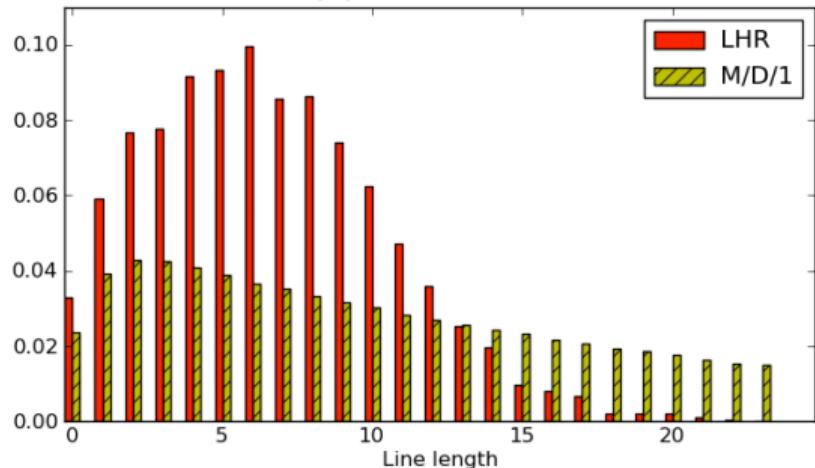
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GSSI, L'Aquila, October 21, 2016

Motivation

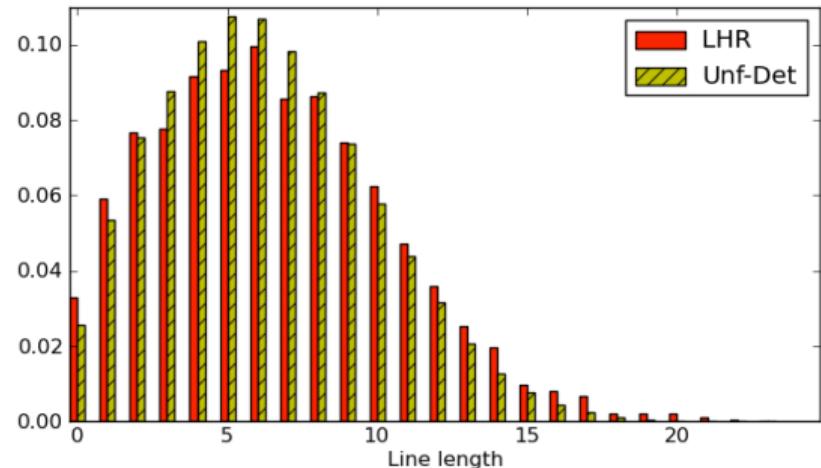
Single-server queue model with deterministic service time

M/D/1 vs Heatrow data



Poissonian Arrivals

Us20D vs Heatrow data



Pre-Scheduled Random Arrivals

1-D Gas models

Gigi

Data description

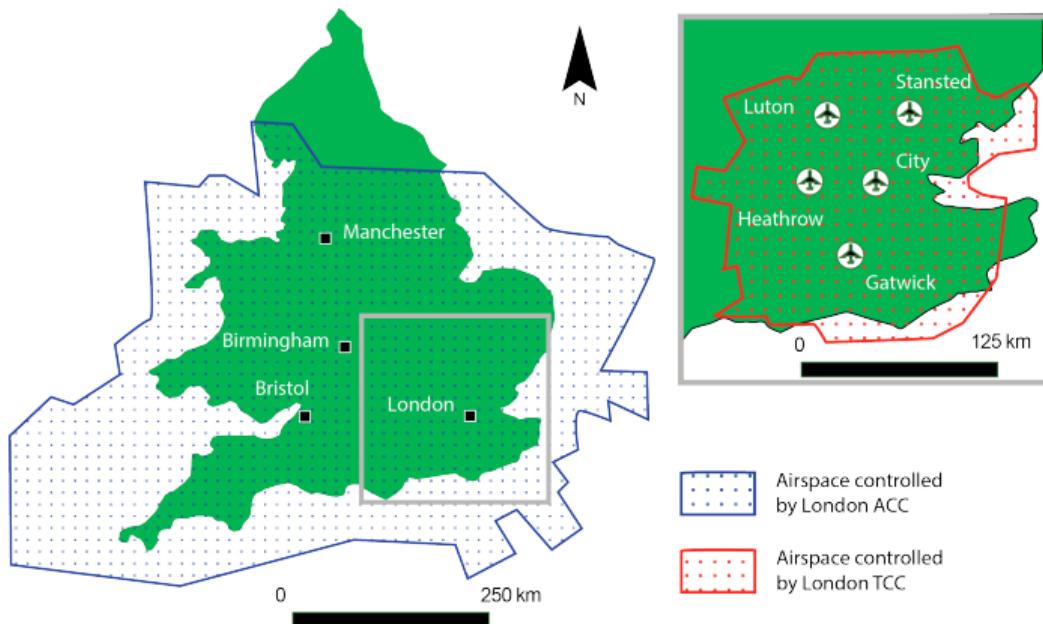
airport name	ICAO code	inbound flights
Frankfurt am Main	EDDF	62531
London Gatwick	EGKK	22119
London Heathrow	EGLL	61880
London Stansted	EGSS	22119
Amsterdam Schiphol	EHAM	55482
Roma Fiumicino	LIRF	45256

Poisson and PSRA-like arrival stream

Something

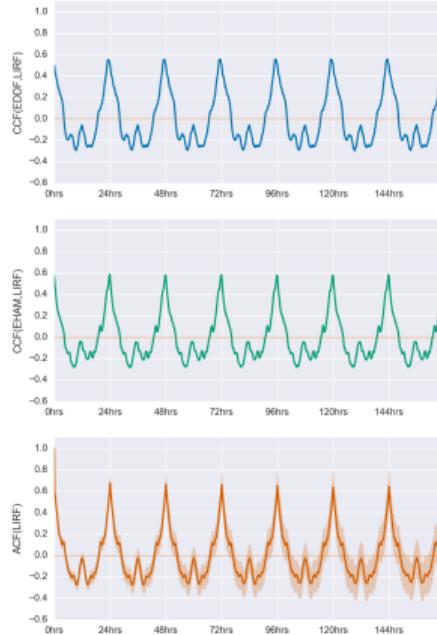
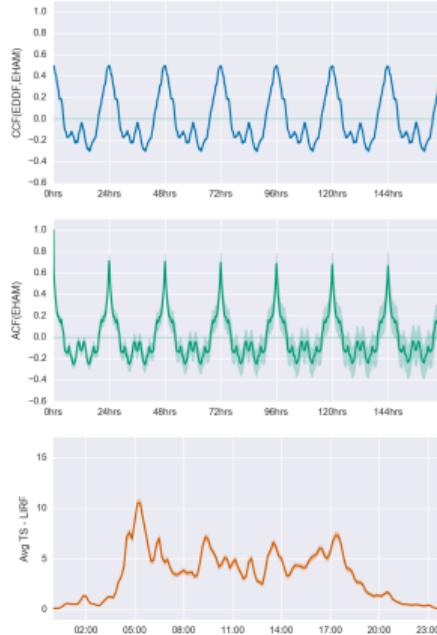
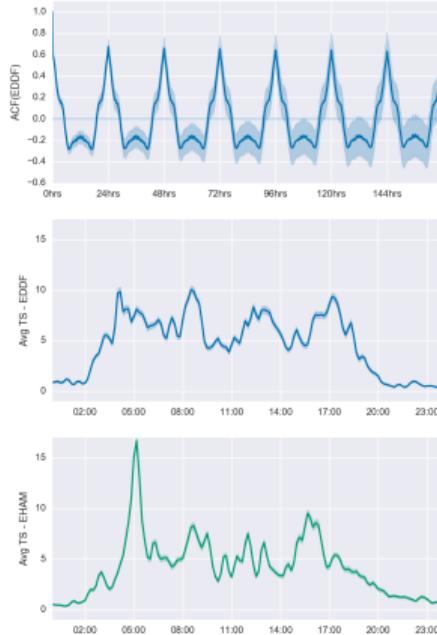
Data querying

- Terminal Control centrally manages and regulates inbound traffic
- The action of Terminal Control reflects a strong interaction between aircraft
- We want to focus on the time until reaching Terminal Control (red airspace)
- A good proxy for this is the time of first descent below 24.000 feet of altitude (FL240)



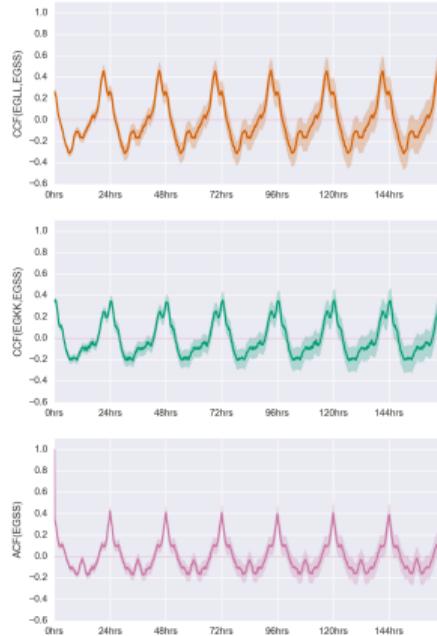
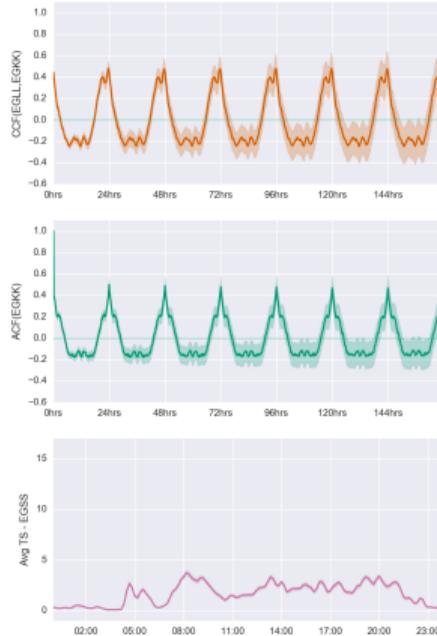
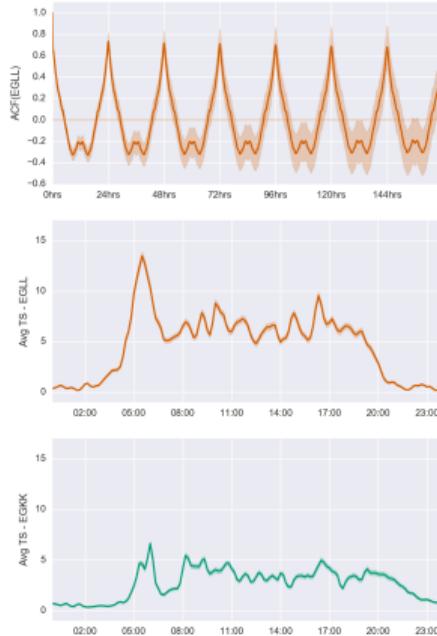
Time series analysis

Frankfurt, Amsterdam, Rome



Time series analysis

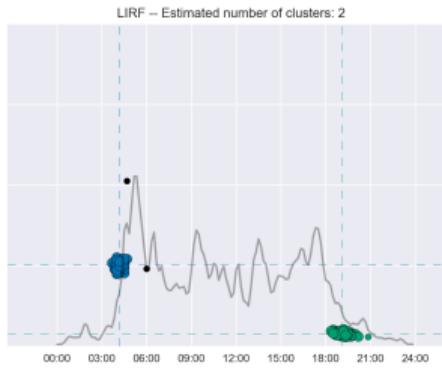
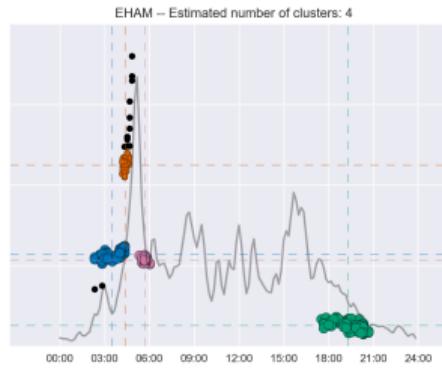
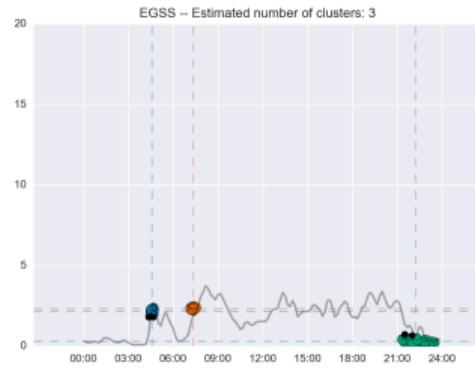
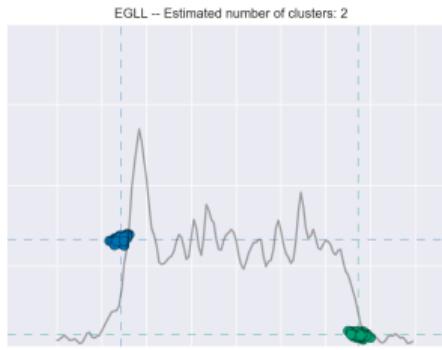
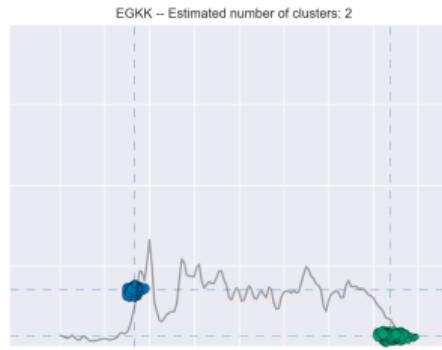
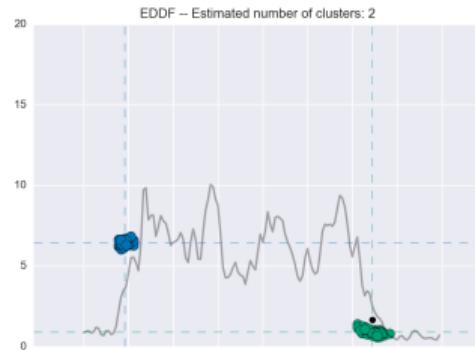
Heathrow, Gatwick, Stansted



Analysis of interarrivals

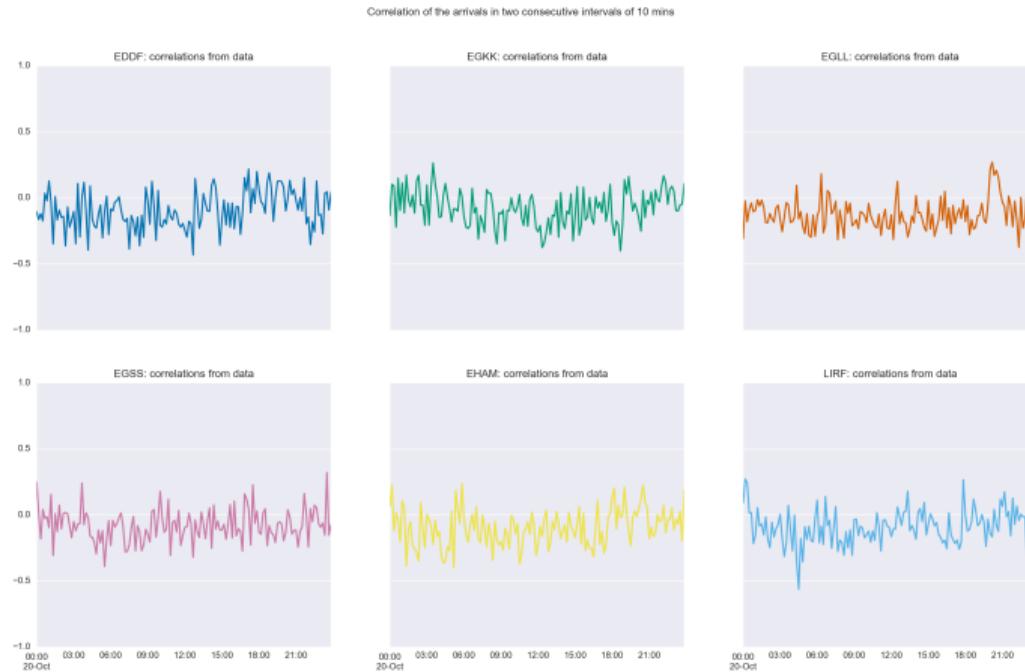
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Construction of non-homogeneous Poisson process



Arrivals are actually correlated

Correlations from M3 data

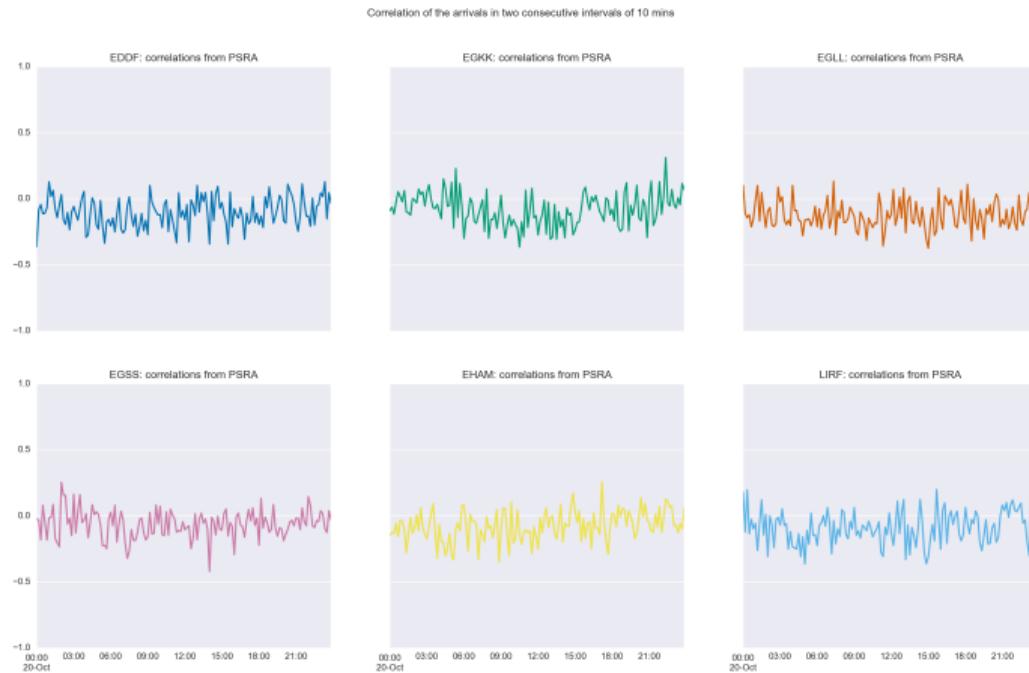


Definition of PSRA-like stream

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PSRA-like arrivals are correlated

Correlations from PSRA

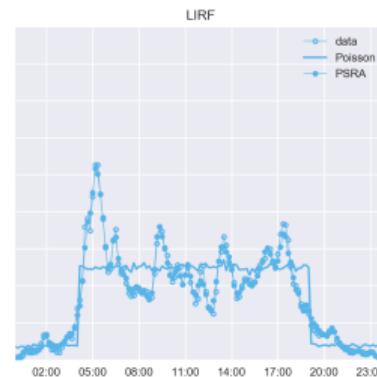
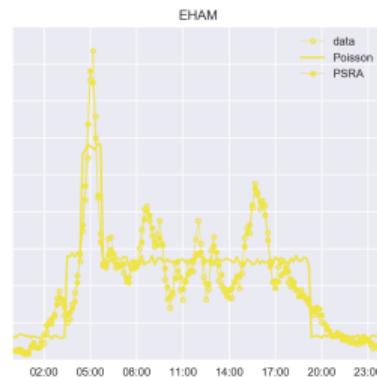
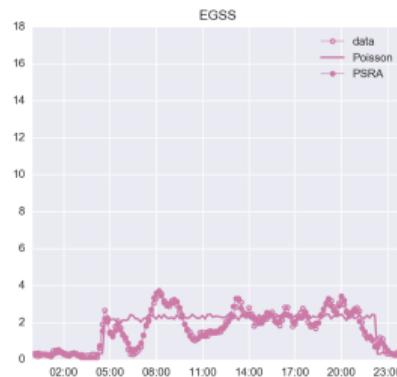
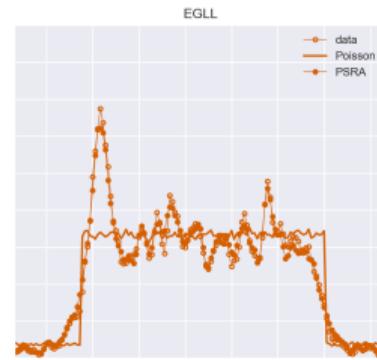
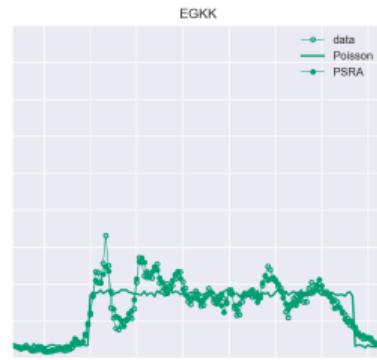
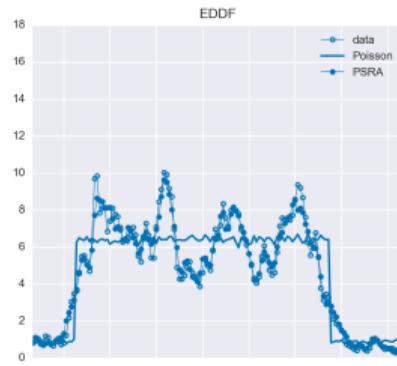


PSRA-like arrivals inherit the correlation structure from M1

Correlations from M1 data



Comparison of daily average arrivals



Conclusions

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