

## **Description of data in travel time aggregation matrix**

Chris Jacobs-Crisioni and Marcin Stepniak

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### **Purpose of data**

These data are compiled to share the data described in Stepniak & Jacobs-Crisioni *Reducing the uncertainty induced by spatial aggregation in accessibility and spatial interaction applications*. Accepted for publication in Journal of Transport Geography, March 2017.

### **Components of data**

The data consists of two components.

#### *Main data*

The main data is in a Microsoft Excel file named “full\_ij\_matrix\_case\_IV”. This file describes in the all\_observations tab, for the three aggregation schemes announced in the paper, the harmonically meaned (M2\_t) travel times as well as the travel times between geographic (M4\_t) and population-weighted (M5\_t) centroids. It further describes the distribution of travel times between two aggregated zones in minimum, maximum and percentile travel times.

This file further describes, for the case of intrazonal observations and in the Intrazonal\_observations tab, the harmonically meaned travel times given different distance decay cases.

In all cases, traveltimes in Case IV have been provided in the shared file. The definitions of all variables is given at the end of this document.

#### *Spatial data*

The zones corresponding to the various aggregation schemes are recorded in an Esri shapefile named Matrix\_ZoneSets. This file contains zone numbers in the id field that correspond with the *from* and *to* codes recorded in the previously mentioned Excel file. The various aggregation levels are coded in the agg\_id field, and correspond with the values in the Excel file as well.

### **Field definitions (see next pages, split per Excel sheet tab)**

<i>All observations</i>	<i>All analysed OD relations, <math>f(tij) = tij^1</math></i>
Variable	Description
id	unique identifier of each observation
agg_id	level of aggregation: 0 = greater regions; 1 = LAU-1; 2 = LAU-2
from	number zone of origin
to	number zone of destination
ii	signals observations where fromzone = tozone (1 if true, 0 if false)
M2_t	benchmark travel time, $f(tij) = tij^1$
M4_t	travel time between geographic centroids
M5_t	travel time between population-weighted centroids
min_t	minimum travel time
p05_t	5th percentile travel time
p10_t	10th percentile travel time
p15_t	15th percentile travel time
p20_t	20th percentile travel time
p25_t	25th percentile travel time
p30_t	30th percentile travel time
p35_t	35th percentile travel time
p40_t	40th percentile travel time
p45_t	45th percentile travel time
p50_t	50th percentile travel time
p55_t	55th percentile travel time
p60_t	60th percentile travel time
p65_t	65th percentile travel time
p70_t	70th percentile travel time
p75_t	75th percentile travel time
p80_t	80th percentile travel time
p85_t	85th percentile travel time
p90_t	90th percentile travel time
p95_t	95th percentile travel time
max_t	maximum travel time

<i>Intrazonal observations</i>	<i>Intrazonal degrees of separation, many distance decay functions</i>
Variable	Description
id	unique identifier of each observation
agg_id	level of aggregation: 0 = greater regions; 1 = LAU-1; 2 = LAU-2
zoneid	number zone
M2t	benchmark travel time, $f(t_{ij}) = t_{ij}^1$
M2d1_25	benchmark travel distance, $f(d_{ij}) = d_{ij}^{1.25}$
M2d1_50	benchmark travel distance, $f(d_{ij}) = d_{ij}^{1.50}$
M2d1_75	benchmark travel distance, $f(d_{ij}) = d_{ij}^{1.75}$
M2d	benchmark travel distance, $f(d_{ij}) = d_{ij}^1$
M2t2	benchmark travel time, $f(t_{ij}) = t_{ij}^2$
M2d2	benchmark travel distance, $f(d_{ij}) = d_{ij}^2$
M2d2_5	benchmark travel distance, $f(d_{ij}) = d_{ij}^{2.5}$
M2t4	benchmark travel time, $f(t_{ij}) = t_{ij}^4$
M2d4	benchmark travel distance, $f(d_{ij}) = d_{ij}^4$
M2t8	benchmark travel time, $f(t_{ij}) = t_{ij}^8$
M2d8	benchmark travel distance, $f(d_{ij}) = d_{ij}^8$
M2_de_StEU	benchmark travel distance, $f(d_{ij}) = \exp(-0.006 * d_{ij})$
M2_de_StNat	benchmark travel distance, $f(d_{ij}) = \exp(-0.023 * d_{ij})$
M2_de_GvE	benchmark travel distance, $f(d_{ij}) = \exp(-0.039 * d_{ij})$
M2_de_Martz	benchmark travel distance, $f(d_{ij}) = \exp(-0.068 * d_{ij})$
M2_de_015	benchmark travel distance, $f(d_{ij}) = \exp(-0.15 * d_{ij})$
M2_de_Hayns	benchmark travel distance, $f(d_{ij}) = \exp(-0.25 * d_{ij})$
M2_de_025	benchmark travel distance, $f(d_{ij}) = \exp(-0.289 * d_{ij})$
M2_de_090	benchmark travel distance, $f(d_{ij}) = \exp(-0.90 * d_{ij})$
Pop	Population in zone
km2	Area of zone (square kilometres)
dpop	Average distance to the zone's population-weighted centre