



From Survey to Model

Capturing Relative Perceptions of Transit Time in the Emme Strategy Transit Assignment

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Background

Changes afoot

transit assignment, mode choice model

Why?

previously...

no “clean” way to represent rail bias

3 transit assignments, 3 utilities, 3 constants



Background

Goals

1 assignment, 1 utility, 1 constant

shift transit modal explanatory power from constant to time variables

integrate mode choice coefficients and path choice parameters (New Starts)

Data

stated preference survey (PB, RSG, Bradley)



Background

All Transit Minutes are not Created Equal

Stop Types

major stop

simple shelter

basic pole

Transit sub-modes

light rail

streetcar

bus



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Background

Previous

New

Stop Type	Constant	Wait1 Coefficient	Wait2 Coefficient	Constant	Wait1 Coefficient	Percent of Type E	Wait2 Coefficient	Percent of Type E
A,B,C		-0.0576	-0.04	0.1582	-0.0504	88%	-0.0350	88%
D		-0.0576	-0.04	0.0531	-0.0535	93%	-0.0372	93%
E		-0.0576	-0.04		-0.0576		-0.0400	

Mode	Constant	Bus Base Difference	In-vehicle Coefficient	Percent of Bus Base	Constant	Bus Base Difference	In-vehicle Coefficient	Percent of Bus Base
LRT	-3.635	(+.215)	-0.0215		-3.71	(+.1442)	-0.0185	86%
Streetcar	-3.850		-0.0215		-3.75	(+.0984)	-0.0215	
Bus	-3.850		-0.0215		-3.85		-0.0215	



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Path Choice

Strategy Transit Assignment with Variants (5.32)

Wait Time Perception

classify stop nodes

populate extra attribute (node) with wait time parameter

designate extra attribute as wait time perception factor

In-vehicle Time Perception

populate extra attribute (segment) with in-vehicle time parameter

designate extra attribute as in-vehicle time perception factor



Matrices

Time Variables

wait time: weighted

in-vehicle time: unweighted

Constants

no influence on path choice

matrices needed for mode choice model



Matrices

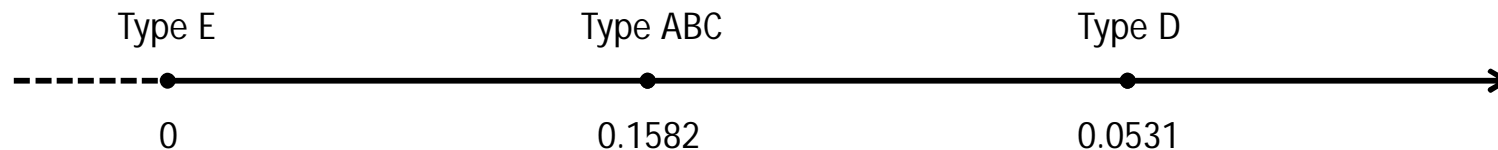
Analysis for Strategy Transit Assignment with Variants (6.27)

Stop Type Constant

populate extra attribute (node) with constant

path-based analysis → sum of constants along path(s)

sum / total boardings = average constant



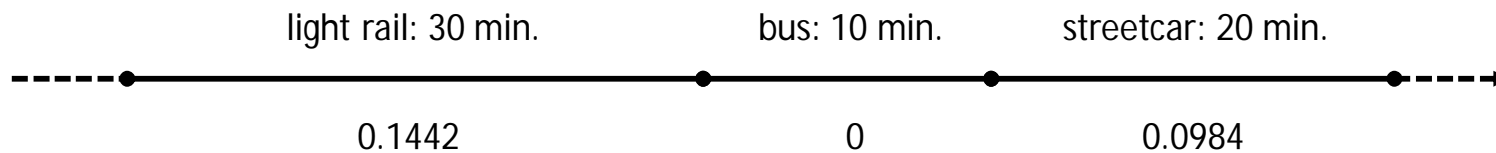
$$\text{constant} = (0 + 0.1582 + 0.0531) / 3 = 0.0704$$



Matrices

Mode Constant

determine each mode's share of total in-vehicle time
multiply constants by shares and sum



$$\text{constant} = (0.5 * 0.1442) + (0.17 * 0) + (0.33 * 0.0984) = 0.1049$$



Mode Choice Model

Utility Equation

$$U = -4.35 + \text{constant}_{\text{stop type}} + \text{constant}_{\text{mode}} \\ - 0.03608 * (\text{IVT}_{\text{bus}} + (\text{IVT}_{\text{lrt}} * \text{parameter}_{\text{lrt}}) + (\text{IVT}_{\text{sc}} * \text{parameter}_{\text{sc}})) \\ - 0.05760 * \text{wt1} - 0.04002 * \text{wt2} \\ - 0.09956 * \text{walk} - 0.3 * \text{transfers} + \text{cost}$$



Acknowledgements

INRO

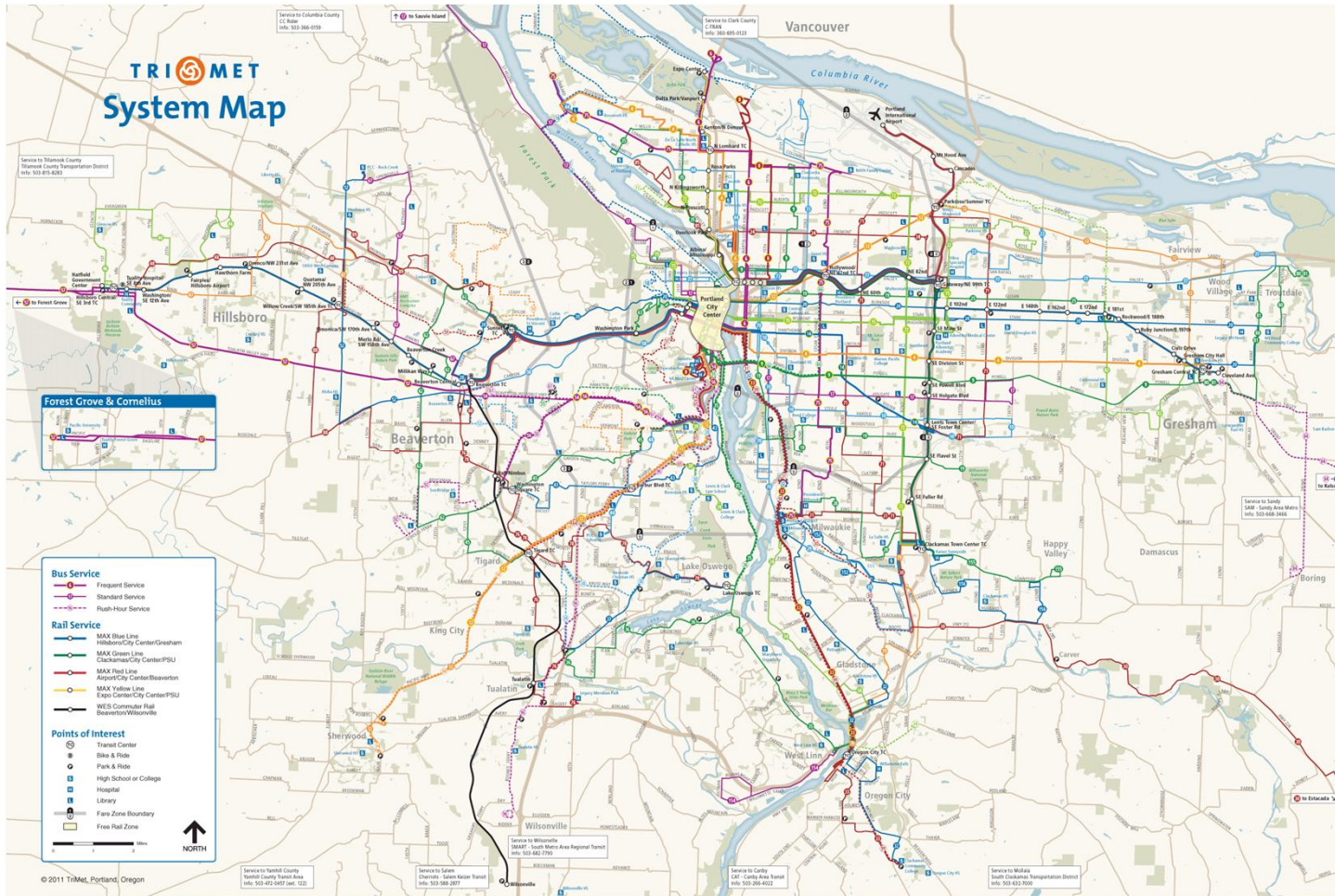
Parsons Brinckerhoff

RSG

Mark Bradley



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Impacts

Better path choices – desirability of higher order transit service is recognized

Cleaner delineation of alternatives for New Starts analysis

Single assignment

Easy implementation



Concurrent Enhancements

Emme

Distribution of flow between connectors

Distribution of flow between attractive lines

One-way transit lines (no midpoint layover)

Other

Park-and-ride lot choice model

New zone system

New base year

New land use

