Test Data Sets for TISA QBench Calculations

Version 1.0

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1 Introduction

In order to ensure the correct implementation of the TISA QBench Calculations eight sets of test data (reported and ground truth travel times and desired benefits) are provided.

Each test data set has the following structure:

- the length (travelled distance), free flow travel times and ground truth travel times are fixed
- the reported travel time is sampled in 2 resp. 10 seconds steps and the corresponding Benefits (Ideal Benefit and Actual Benefit) are provided
- the Benefits are rounded up to two digits, this allows an error margin of 0.01
- further values which are computed in the TISA QBench calculations are provided for debugging:
    - upper and lower tolerance boundaries
    - congestion threshold
    - bounding-from-below travel time

The data sets have been built up in the travel time domain. In the TISA QBench Calculations all values start in the speed domain. To be compliant to this, the travel times are also given as speed values. Please note that one would have an error margin if one would start from the speed values.

2 Scenarios

The different data sets are constructed for testing specific aspects of the TISA QBench Calculations. These scenarios are irrelevant if your implementation accurately reproduces the given Benefits. However they are stated in the table below (and the provided spread sheet) to help identify problems when debugging.

- The four first cases represent congested ones while the others represent non congested cases.
- The travelled distance for all cases is **1000 meters**.
- The bounding from below is the minimum of the stand still TT (which is derived from the stand still speed of 1m/s) and a capping (10% of the free flow speed).

Name	Free Flow TT [sec]	Bounding from Below TT [sec]	Congestion Threshold TT [sec]	Ground Truth TT [sec]	Lower Tolerance TT [sec]	Upper Tolerance TT [sec]	Further Details
CongA	30	300	60	65	54.97	79.51	LowerTolerance < CongestionThresholdT
CongB	30	300	60	120	99.17	151.90	LowerTolerance > CongestionThreshold
CongC	30	300	60	260	203.13	361.11	UpperTolerance > Bounding_Below
CongD	140	1000	280	300	230.77	428.57	
NonCongA	30	300	60	30	25.75	35.93	GroundTruth = FreeFlow
NonCongB	30	300	60	40	34.19	48.19	UpperTolerance < CongestionThreshold
NonCongC	30	300	60	55	46.71	66.87	UpperTolerance > CongestionThreshold
NonCongD	140	1000	280	240	188.98	328.77	

3 Format

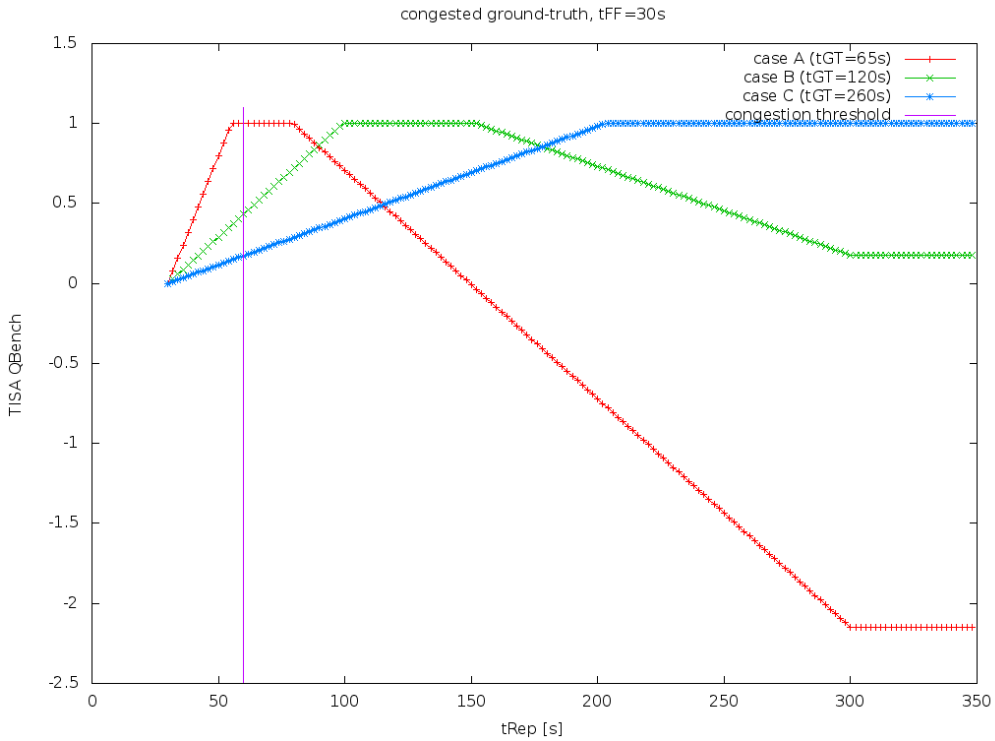
Each data set is a .csv -file with a few headerlines (marked by "#") containing a short description of the test scenario, the fixed length, free flow and ground truth speeds and travel times. Further values are given for debugging (as in the table above). The body of the file contains the sampled reported travel times and corresponding Benefits.

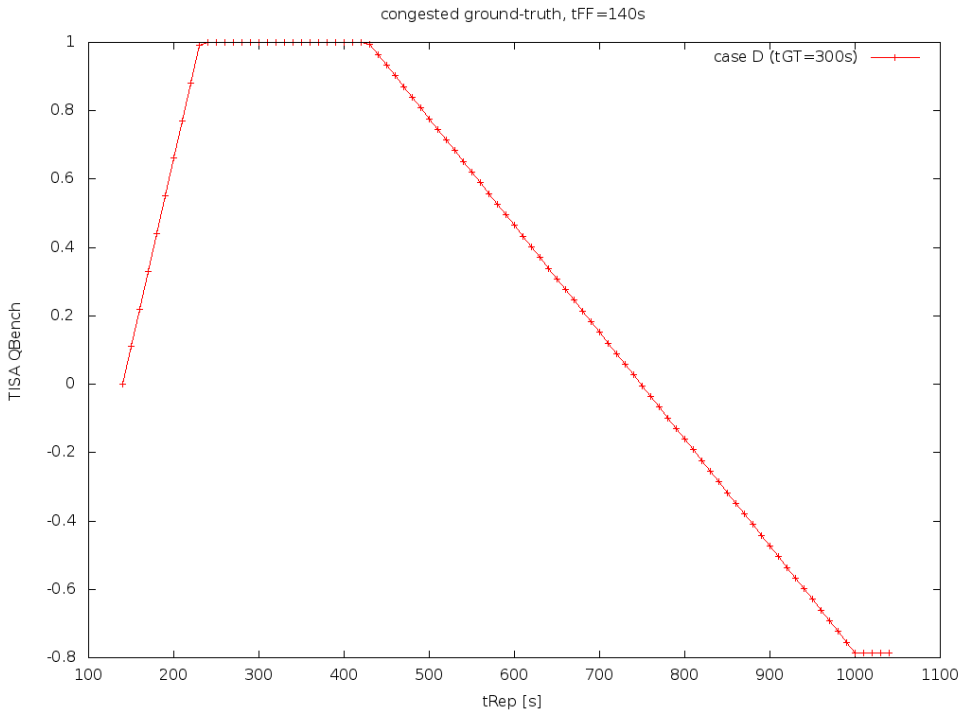
For example:

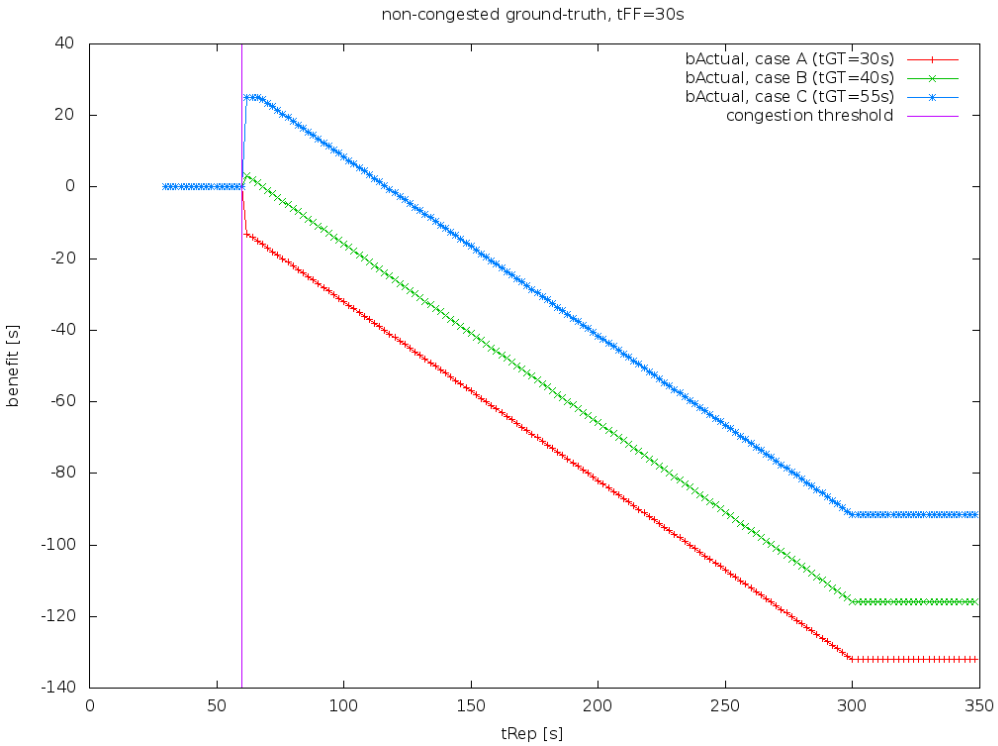
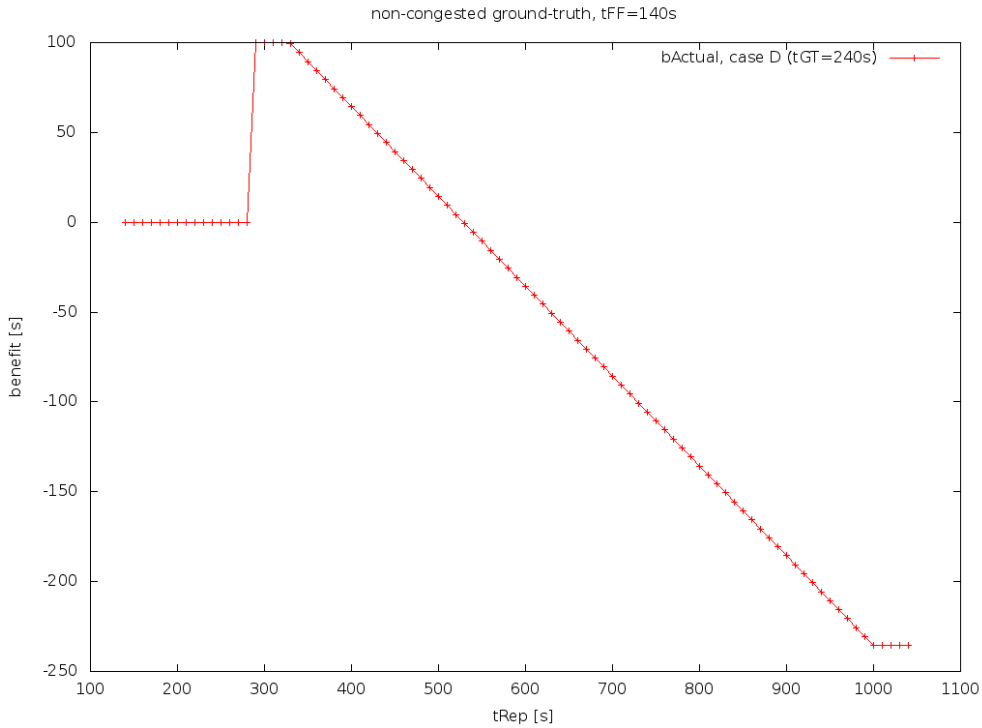
```
# congested ground-truth, tLower < tCT, tStndStill relative

# length [m]: 1000.0
# vFF [m/s]: 33.33, tFF [s]: 30
# vGT [m/s]: 15.38, tGT [s]: 65

# vCT [m/s]: 16.67, tCT [s]: 60.0
# vLower [m/s]: 12.58, tUpper [s]: 79.51
# vUpper [m/s]: 18.19, tLower [s]: 54.97
# bounding-from-below speed [m/s]: 3.33, bounding-from-below travel time [s]: 300

# vRep [m/s], tRep [s], bIdeal [s], bActual [s], penalty [s]
33.333, 30, 35.0, 0.0, 35.0
31.25, 32, 35.0, 2.8, 32.2
29.412, 34, 35.0, 5.61, 29.39
27.778, 36, 35.0, 8.41, 26.59
26.316, 38, 35.0, 11.21, 23.79
25.0, 40, 35.0, 14.02, 20.98
23.81, 42, 35.0, 16.82, 18.18
22.727, 44, 35.0, 19.62, 15.38
21.739, 46, 35.0, 22.43, 12.57
20.833, 48, 35.0, 25.23, 9.77
20.0, 50, 35.0, 28.04, 6.96
19.231, 52, 35.0, 30.84, 4.16
[...]
```

Visualization

If one would plot the TISA QBench scores for variable reported travel times on fixed ground truth travel times, the following results would be seen.





If one would

plot the Actual Benefits for variable reported travel times on fixed ground truth travel times, the following results would be seen.