# Experiment
## `2025-09-16_11-54-47_defaultWallGap2D`

Planner Developer Tools (PDT)

September 16, 2025

# 1 Overview

This report was automatically generated using Planner Developer Tools (PDT). It presents the results for the `2025-09-16_11-54-47_defaultWallGap2D` experiment, which executed 100 runs of Informed RRT*, AIT*, and EIT* on the `defaultWallGap2D` planning context. See appendix A.1 for more information about the experiment setup.

## 1.1 Results Summary

| Planner | $t^{\text{min}}_{\text{init}}$ | $t^{\text{med}}_{\text{init}}$ | $t^{\text{max}}_{\text{init}}$ | $c^{\text{min}}_{\text{init}}$ | $c^{\text{med}}_{\text{init}}$ | $c^{\text{max}}_{\text{init}}$ | $c^{\text{min}}_{\text{final}}$ | $c^{\text{med}}_{\text{final}}$ | $c^{\text{max}}_{\text{final}}$ | Success |
|---|---|---|---|---|---|---|---|---|---|---|
| Informed RRT* | 0.0186 | 0.0614 | $\infty$ | 0.6458 | 1.1977 | $\infty$ | 0.6385 | 1.0941 | $\infty$ | 0.84 |
| AIT* | **0.0057** | 0.0138 | 0.0640 | **0.6343** | 0.9919 | **1.1989** | **0.6324** | 0.6356 | **0.6477** | **1.00** |
| EIT* | 0.0059 | **0.0093** | **0.0158** | 0.6385 | **0.9917** | 1.3188 | 0.6325 | **0.6347** | 0.9661 | **1.00** |

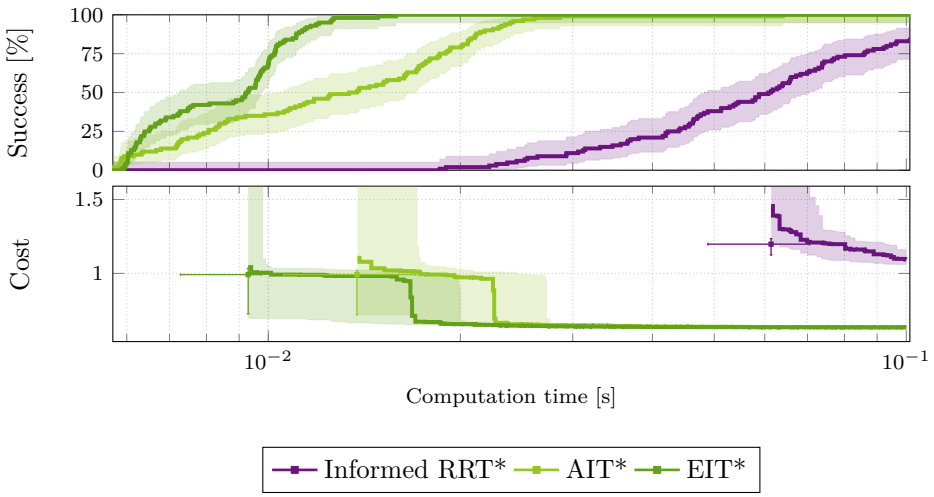


Figure 1: **Top:** Percentage of runs that found a solution at any given time with a Clopper-Pearson (nonparametric) 99% confidence interval. **Bottom:** Median cost evolution and median of initial solution with nonparametric 99% confidence intervals.

## 1.2 Initial Solutions

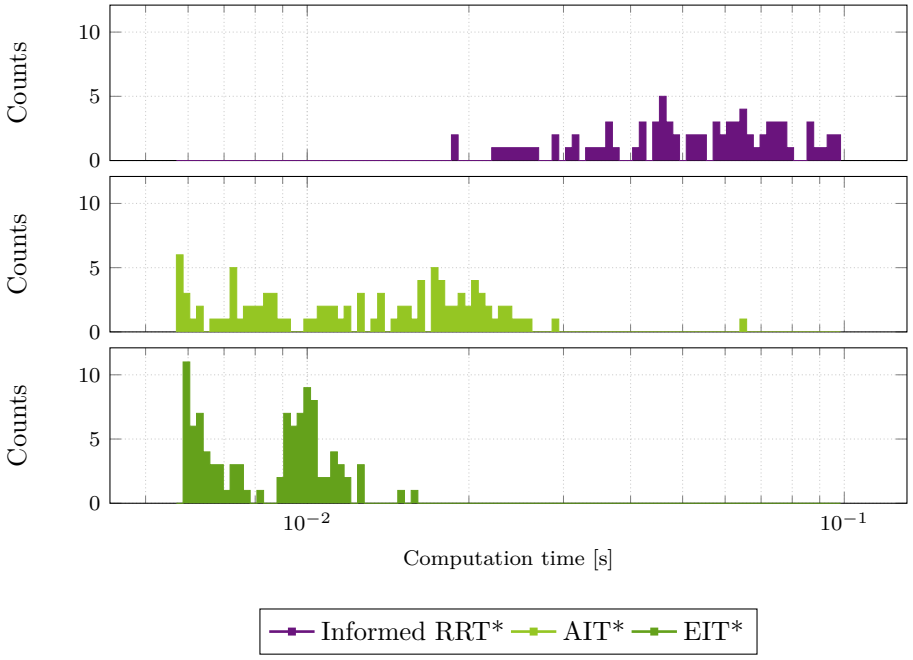


Figure 2: Histograms of initial solution times.

# 2 Informed RRT*

## 2.1 Initial Solutions

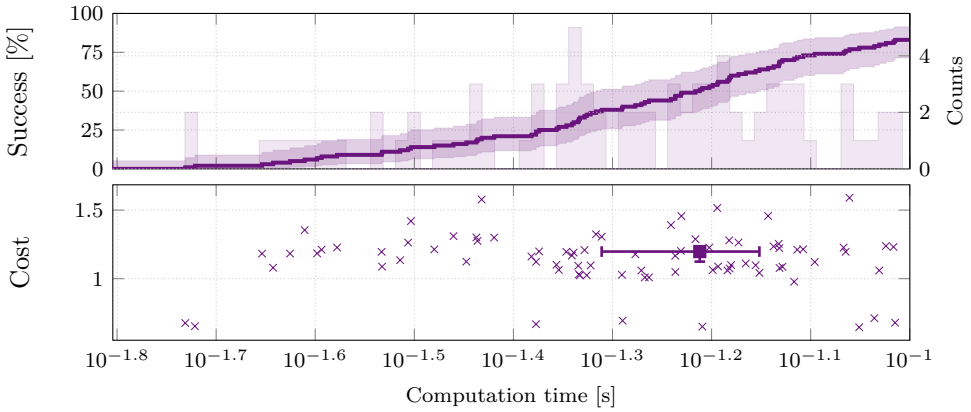


Figure 3: **Top:** Histogram and associated empirical distribution function (EDF) of Informed RRT* with a Clopper-Pearson (nonparametric) 99% confidence interval for the underlying CDF. **Bottom:** All initial solutions of Informed RRT* and their median with a nonparametric 99% confidence interval.

## 2.2 Cost Evolution

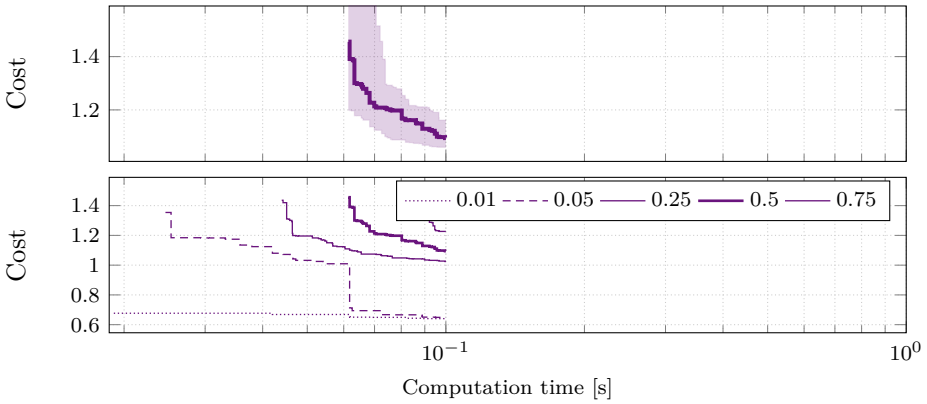


Figure 4: **Top:** Median cost evolution of Informed RRT* with a nonparametric 99% confidence interval. **Bottom:** Seven percentiles of the cost evolution of Informed RRT*.

# 3 AIT*

## 3.1 Initial Solutions

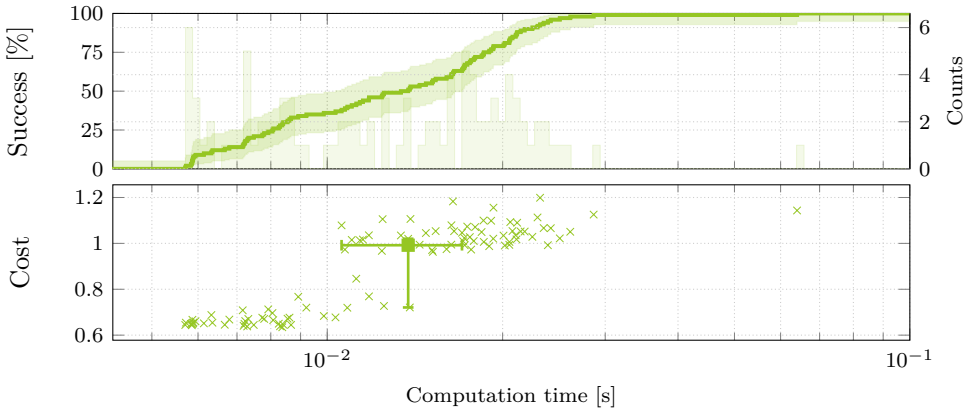


Figure 5: **Top:** Histogram and associated empirical distribution function (EDF) of AIT* with a Clopper-Pearson (nonparametric) 99% confidence interval for the underlying CDF. **Bottom:** All initial solutions of AIT* and their median with a nonparametric 99% confidence interval.

## 3.2 Cost Evolution

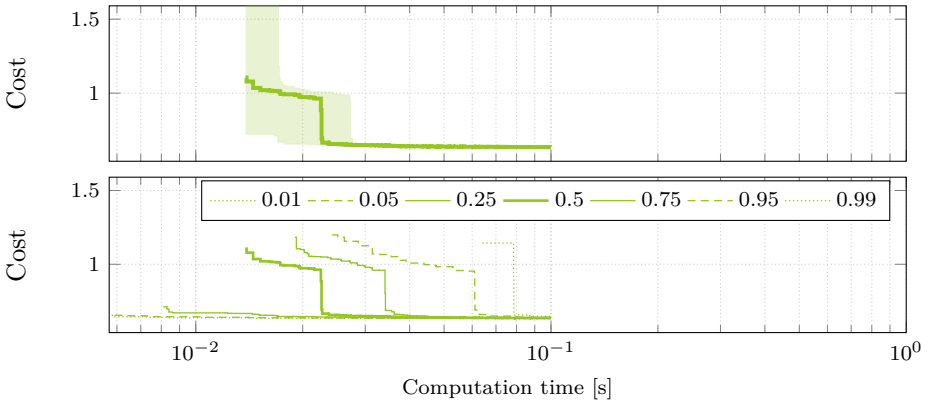


Figure 6: **Top:** Median cost evolution of AIT* with a nonparametric 99% confidence interval. **Bottom:** Seven percentiles of the cost evolution of AIT*.

# 4 EIT*

## 4.1 Initial Solutions

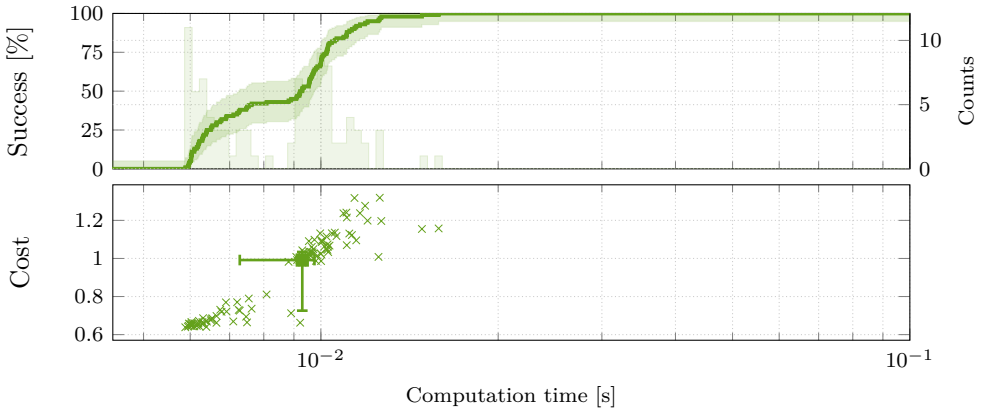


Figure 7: **Top:** Histogram and associated empirical distribution function (EDF) of EIT* with a Clopper-Pearson (nonparametric) 99% confidence interval for the underlying CDF. **Bottom:** All initial solutions of EIT* and their median with a nonparametric 99% confidence interval.

## 4.2 Cost Evolution

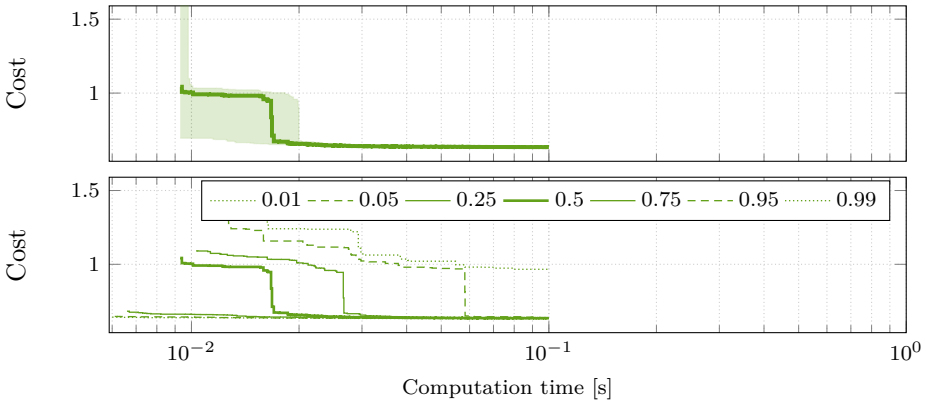


Figure 8: **Top:** Median cost evolution of EIT* with a nonparametric 99% confidence interval. **Bottom:** Seven percentiles of the cost evolution of EIT*.

# A Configuration

## A.1 Experiment


```
{
  "baseDirectory": "/home/ubuntu/Desktop/hzmp_project/pdt/build/benchmarks/",
  "context": "defaultWallGap2D",
  "executable": "benchmark",
  "experimentDirectory": "/home/ubuntu/Desktop/hzmp_project/pdt/build/benchmarks/2025-09-16_11-54-47_defaultWallGap2D",
  "loadDefaultContextConfig": true,
  "loadDefaultObjectiveConfig": true,
  "loadDefaultPlannerConfig": true,
  "loadDefaultReportConfig": true,
  "logFrequency": 10000,
  "name": "2025-09-16_11-54-47_defaultWallGap2D",
  "numRuns": 100,
  "planners": [
    "defaultInformedRRTstar",
    "defaultAITstar",
    "defaultEITstar"
  ],
  "results": [
    "/home/ubuntu/Desktop/hzmp_project/pdt/build/benchmarks/2025-09-16_11-54-47_defaultWallGap2D/raw/results_0.csv"
  ],
  "seed": 10981395723979876,
  "useOnlyThisConfig": true
}
```


## A.2 defaultWallGap2D


```
{
  "boundarySideLengths": [
    1,
    1
  ],
  "collisionCheckResolution": 5e-06,
  "dimensions": 2,
  "gapOffset": 0.1,
  "gapWidth": 0.04,
  "goal": [
```

```
    0.3,
    0.0
  ],
  "goalType": "GoalState",
  "maxTime": 0.1,
  "objective": "defaultPathLength",
  "start": [
    -0.3,
    0.0
  ],
  "type": "WallGap",
  "wallThickness": 0.2,
  "wallWidth": 0.8
}
```

### A.3 Informed RRT*

```
{
  "isAnytime": true,
  "options": {
    "goalBias": 0.05,
    "maxEdgeLength": {
      "12d": 2.0,
      "14d": 2.4,
      "16d": 3.0,
      "2d": 0.3,
      "32d": 7.0,
      "3d": 0.4,
      "4d": 0.5,
      "6d": 0.9,
      "8d": 1.25
    },
    "numSamplingAttempts": 1,
    "rewireFactor": 1.001,
    "useKNearest": false
  },
  "report": {
    "color": "pdtpurple",
    "name": "Informed RRT*"
  },
  "type": "InformedRRTstar"
}
```

### A.4 AIT*

```
{
  "isAnytime": true,
  "options": {
    "batchSize": 100,
    "enablePruning": true,
    "repairBackwardSearch": true,
    "rewireFactor": 1.001,
    "trackApproximateSolutions": false,
    "useKNearest": true
  },
  "report": {
    "color": "pdtlightgreen",
    "name": "AIT*"
  },
  "type": "AITstar"
}
```

### A.5 EIT*

```
{
  "isAnytime": true,
  "options": {
    "batchSize": 100,
    "collisionDetectionOnReverseSearch": true,
    "enablePruning": true,
    "numInitialCollisionChecks": 1,
    "radiusFactor": 1.001,
    "repairFactor": 1.2,
    "repairReverseSearchTreeUponCollisionDetection":
       false,
    "resetSuboptimalityFactorOnEveryApproximation": false
       ,
    "trackApproximateSolutions": false,
    "useKNearest": true
  },
  "report": {
    "color": "pdtgreen",
    "name": "EIT*"
  },
  "type": "EITstar"
}
```