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Rayleigh Beam Chap3 Ex2

Date

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1. Global Definitions
   1. Parameters 1

Parameters

| **Name** | **Expression** | **Value** | **Description** |
| --- | --- | --- | --- |
| a | 3 | 3.0000 | Angular Inertial constant (E A)/(rho A) |
| b | 1 | 1.0000 | Damping Constant C/(rho A) |
| c | 4 | 4.0000 | Stiffness constant (E I)/(rho A) |
| alpha | 2 | 2.0000 | Frequency of the signal to be tracked |
| alpha2 | alpha^2 | 4.0000 | Frequency square |
| Mr | 3 | 3.0000 | Amplitude of the signal to be tracked |
| L | pi | 3.1416 | beam lenght |

1. Model 1 (mod1)
   1. Definitions
      1. Variables

#### Variables 1a

Selection

|  |  |
| --- | --- |
| Geometric entity level | Entire model |

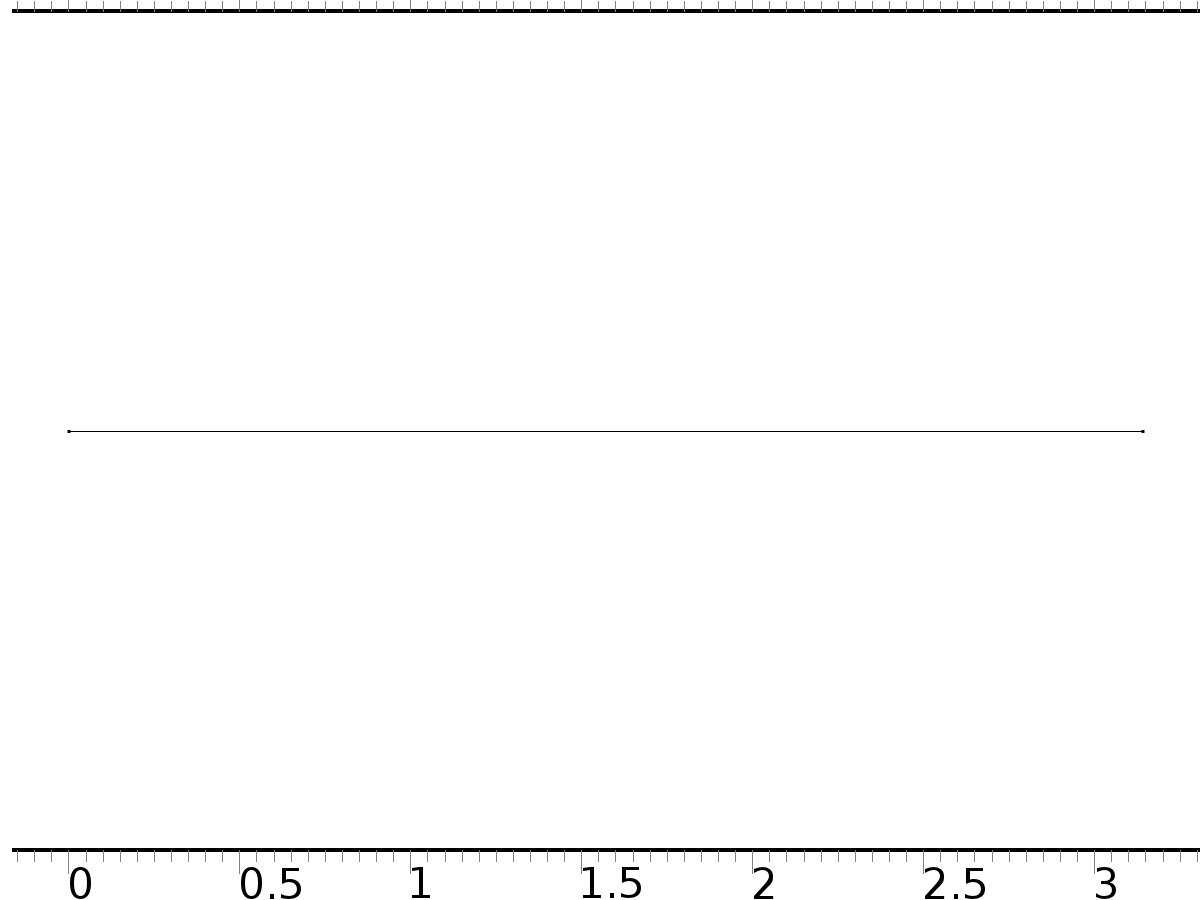
| **Name** | **Expression** | **Description** |
| --- | --- | --- |
| G | C(Xx) |  |
| Gamma1 | (0 - C(PIt1x))/G |  |
| Gamma2 | (-1/alpha - C(PIt2x))/G |  |
| w1 | Mr\*sin(alpha\*t) |  |
| w2 | Mr\*cos(alpha\*t) |  |
| u | Gamma1\*w1 + Gamma2\*w2 |  |
| Cq | C(qxt) |  |
| yr | w1 |  |
| e | Cq - yr |  |

* + 1. Model Couplings

#### Integration 1

|  |  |
| --- | --- |
| Coupling type | Integration |
| Operator name | C |

* 1. Geometry 1

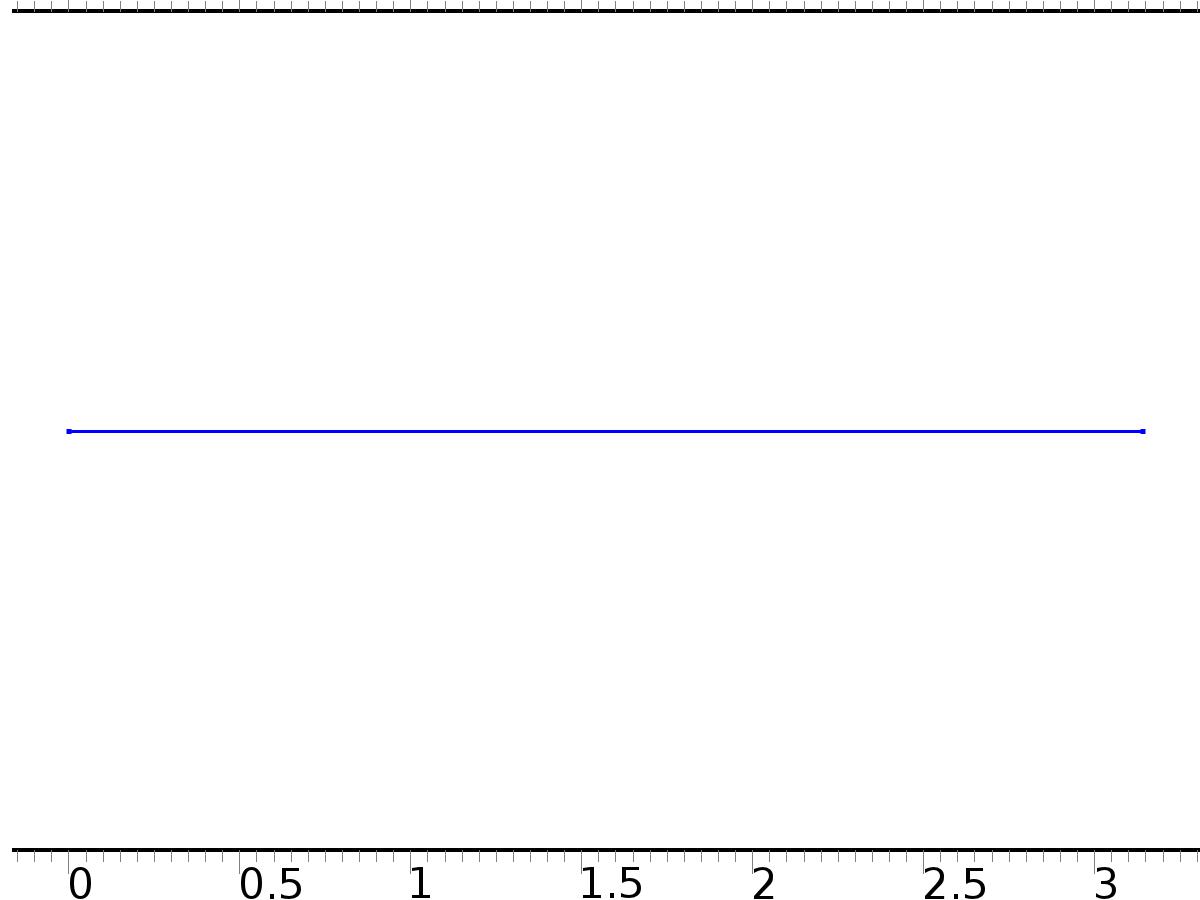


Geometry 1

Units

|  |  |
| --- | --- |
| Length unit | m |
| Angular unit | deg |

* 1. Coefficient Form PDE (c)

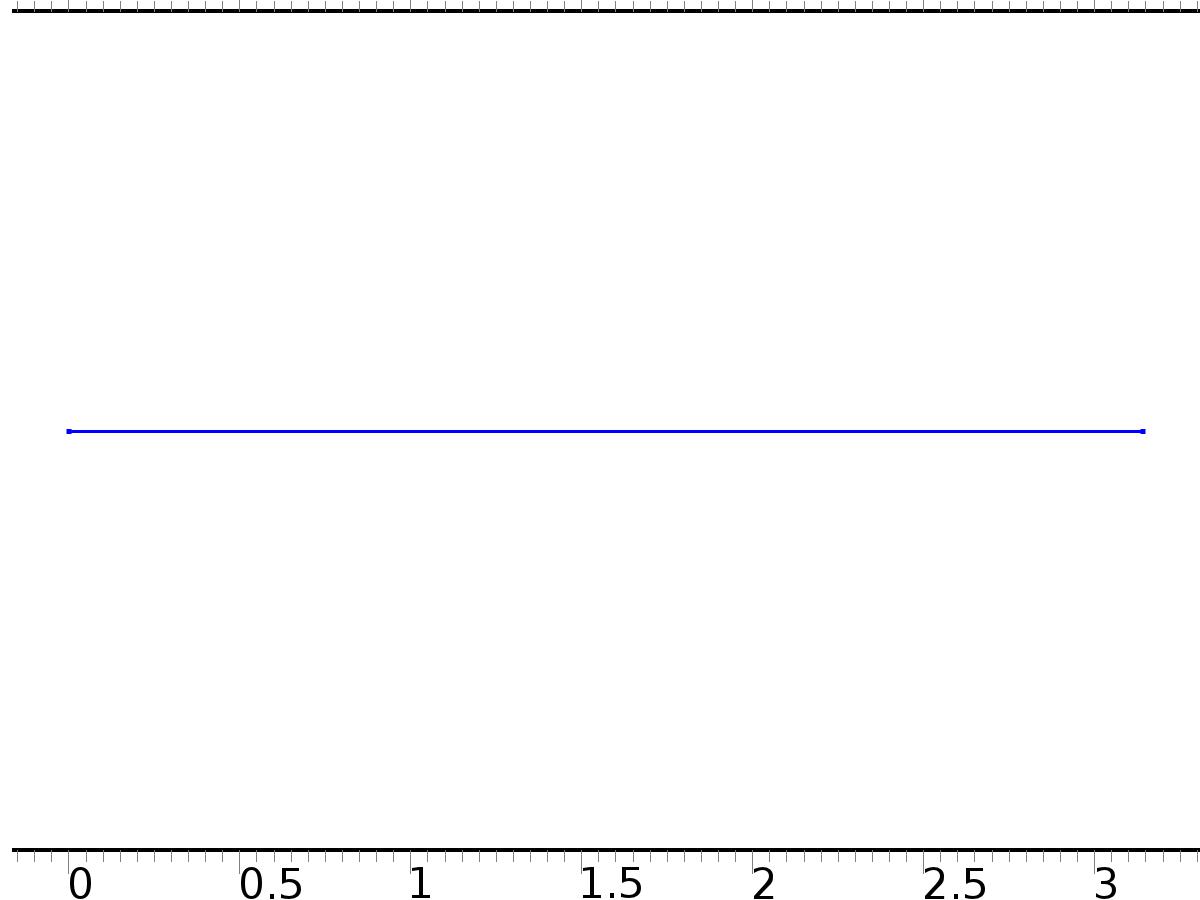


Unit Input

Features

|  |
| --- |
| Coefficient Form PDE 1 |
| Zero Flux 1 |
| Initial Values 1 |
| Homogeneous Dirichlet BC |
| Input Bin\*1 |

* 1. Coefficient Form PDE 2 (c2)

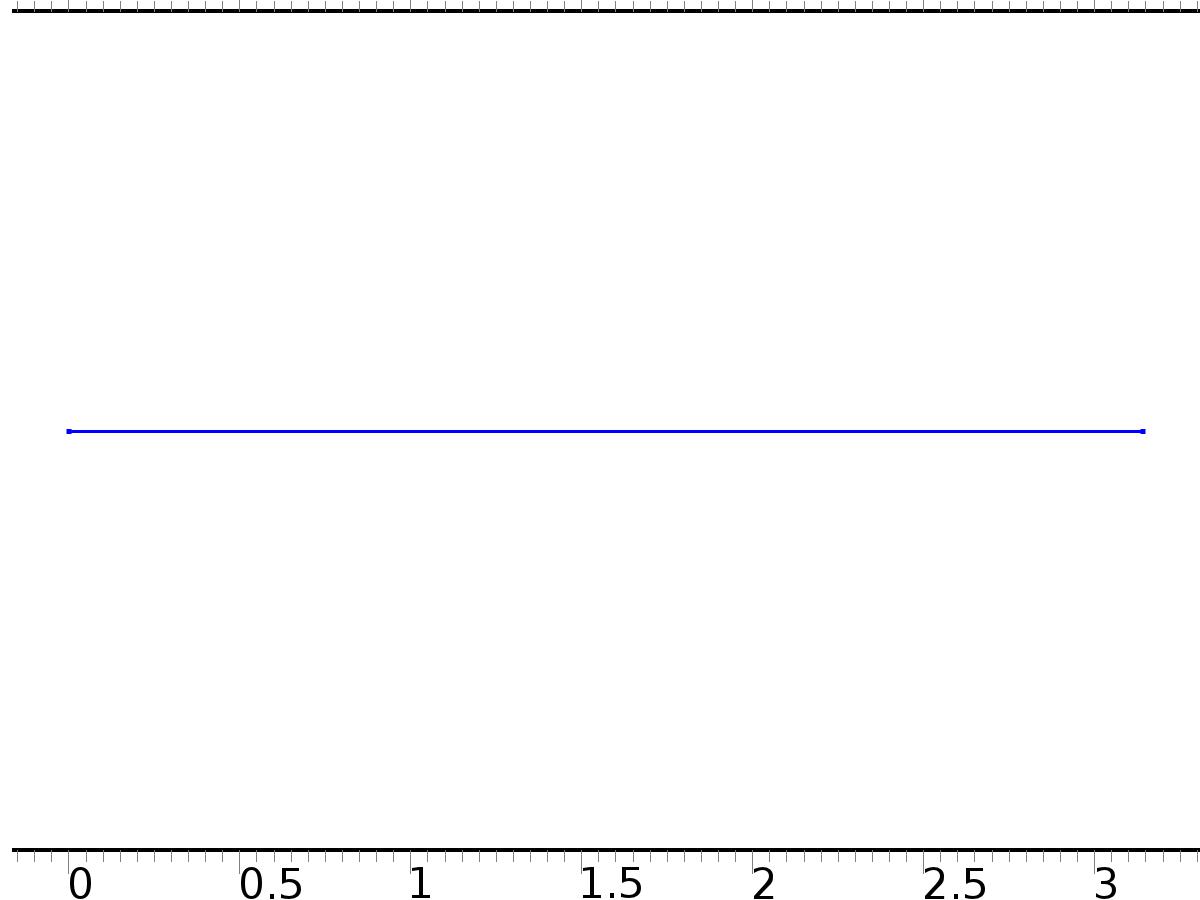


Regulator Eqs

Features

|  |
| --- |
| Coefficient Form PDE 1 |
| Zero Flux 1 |
| Initial Values 1 |
| Homogeneous Dirichlet BC |
| Input Bin\*Gamma |

* 1. Coefficient Form PDE 3 (c3)

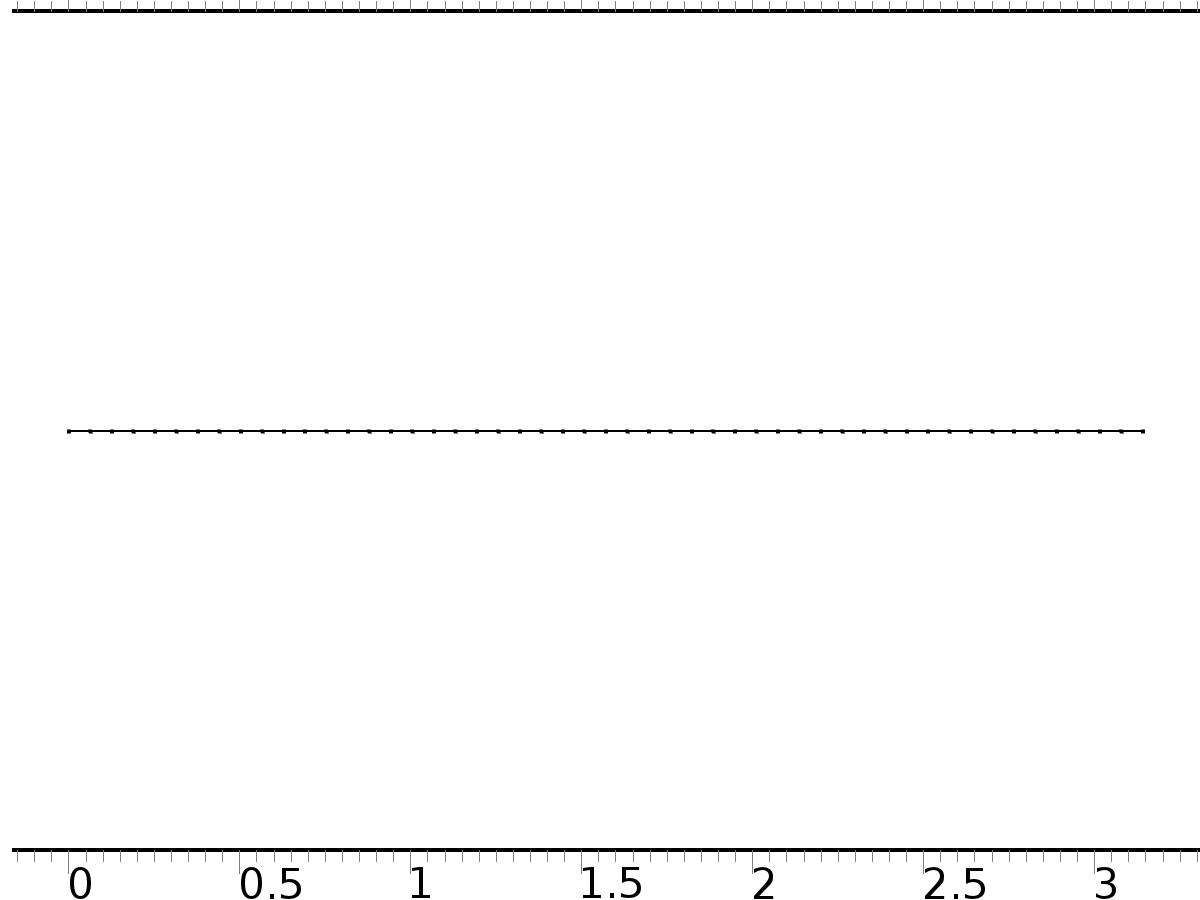


Closed Loop System

Features

|  |
| --- |
| Coefficient Form PDE 1 |
| Zero Flux 1 |
| Initial Values 1 |
| Homogeneous Dirichlet BC |
| Input Bin\*u |

* 1. Mesh 1



Mesh 1

1. Study 1
   1. Stationary

Study settings

| **Description** | **Value** |
| --- | --- |
| Include geometric nonlinearity | Off |

Physics and variables selection

| **Physics interface** | **Discretization** |
| --- | --- |
| Unit Input (c) | physics |

Mesh selection

| **Geometry** | **Mesh** |
| --- | --- |
| Geometry 1 (geom1) | mesh1 |

1. Study 2
   1. Stationary

Study settings

| **Description** | **Value** |
| --- | --- |
| Include geometric nonlinearity | Off |

Physics and variables selection

| **Physics interface** | **Discretization** |
| --- | --- |
| Regulator Eqs (c2) | physics |

Mesh selection

| **Geometry** | **Mesh** |
| --- | --- |
| Geometry 1 (geom1) | mesh1 |

1. Study 3
   1. Time Dependent

Study settings

| **Description** | **Value** |
| --- | --- |
| Include geometric nonlinearity | Off |

| **Times** | **Unit** |
| --- | --- |
| range(0,0.01,50) | s |

Physics and variables selection

| **Physics interface** | **Discretization** |
| --- | --- |
| Closed Loop System (c3) | physics |

Mesh selection

| **Geometry** | **Mesh** |
| --- | --- |
| Geometry 1 (geom1) | mesh1 |

1. Results
   1. Data Sets
      1. Solution 1

Solution

| **Description** | **Value** |
| --- | --- |
| Solution | Solver 1 |
| Component | Save Point Geometry 1 |

* + 1. Solution 2

Solution

| **Description** | **Value** |
| --- | --- |
| Solution | Solver 2 |
| Component | Save Point Geometry 1 |

* + 1. Solution 3

Solution

| **Description** | **Value** |
| --- | --- |
| Solution | Solver 3 |
| Component | Save Point Geometry 1 |

* 1. Derived Values
     1. Global Evaluation 1

Data

| **Description** | **Value** |
| --- | --- |
| Data set | Solution 2 |

Expression

| **Description** | **Value** |
| --- | --- |
| Expression | Gamma2 |
| Unit | 1 |

* + 1. Global Evaluation 2

Data

| **Description** | **Value** |
| --- | --- |
| Data set | Solution 2 |

Expression

| **Description** | **Value** |
| --- | --- |
| Expression | C(PI2x) |
| Unit | 1/m |
| Description | C(PI2x) |

* + 1. Point Evaluation 1

Selection

|  |  |
| --- | --- |
| Geometric entity level | Boundary |
| Selection | Boundary 1 |

Data

| **Description** | **Value** |
| --- | --- |
| Data set | Solution 3 |

Expression

| **Description** | **Value** |
| --- | --- |
| Expression | u |
| Description | u |

* 1. Tables
     1. Table 1

Global Evaluation 1 (G)

Table 1

| **Gamma1 (1)** | **Gamma2 (1)** |
| --- | --- |
| 0.33059 | -0.51683 |

* + 1. Table 2

Global Evaluation 2 (C(PI1x))

Table 2

| **C(PI2x) (1/m)** | **C(PI1x) (1/m)** | **G (1/m)** | **G (1/m)** | **C(PI1x) (1/m)** | **C(PI2x) (1/m)** |
| --- | --- | --- | --- | --- | --- |
| -0.50000 | -0.38542 | 0.38542 | 0.38542 | -2.5382E-14 | -0.50000 |

* + 1. Table 3

Global Evaluation 2 (C(PI1x))

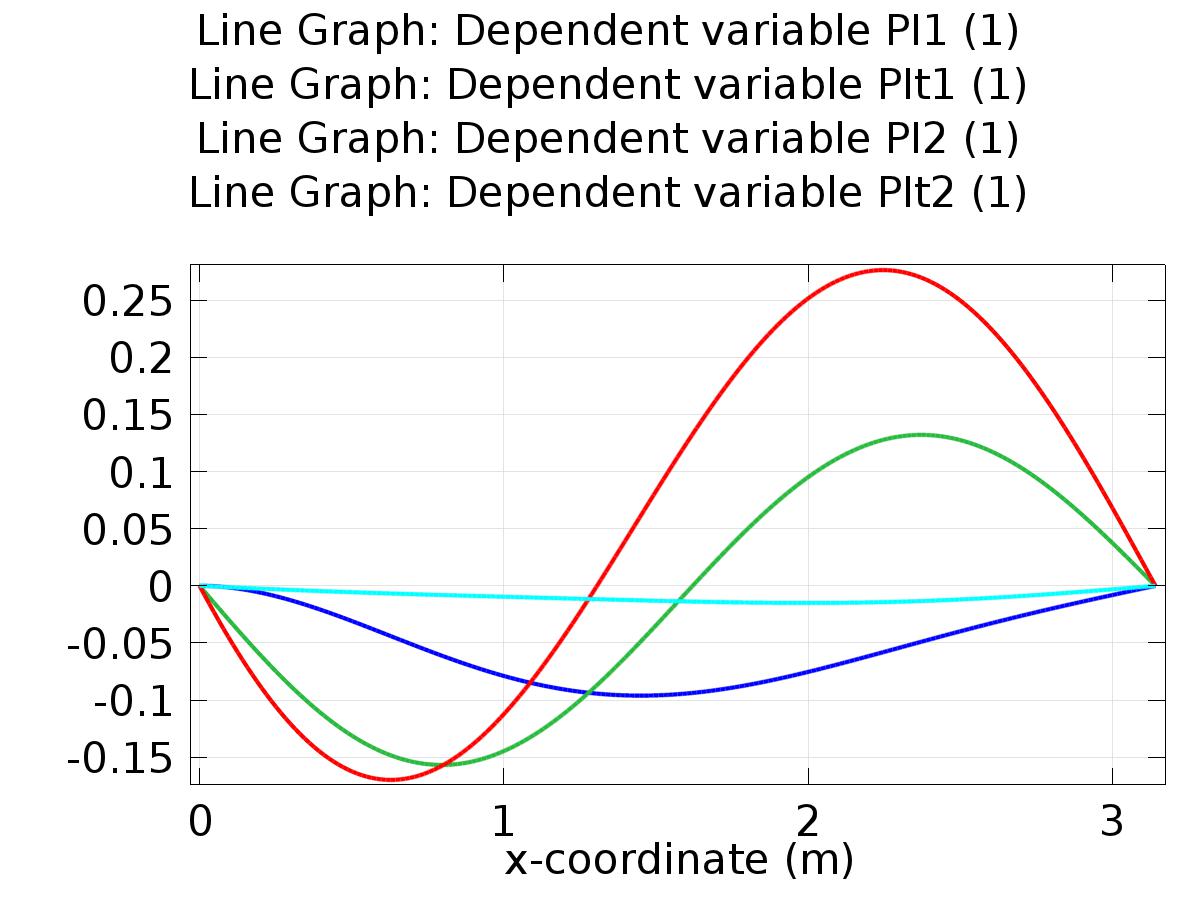
* + 1. Table 4

Point Evaluation 1 (zxt)

* 1. Plot Groups
     1. 1D Plot Group 1

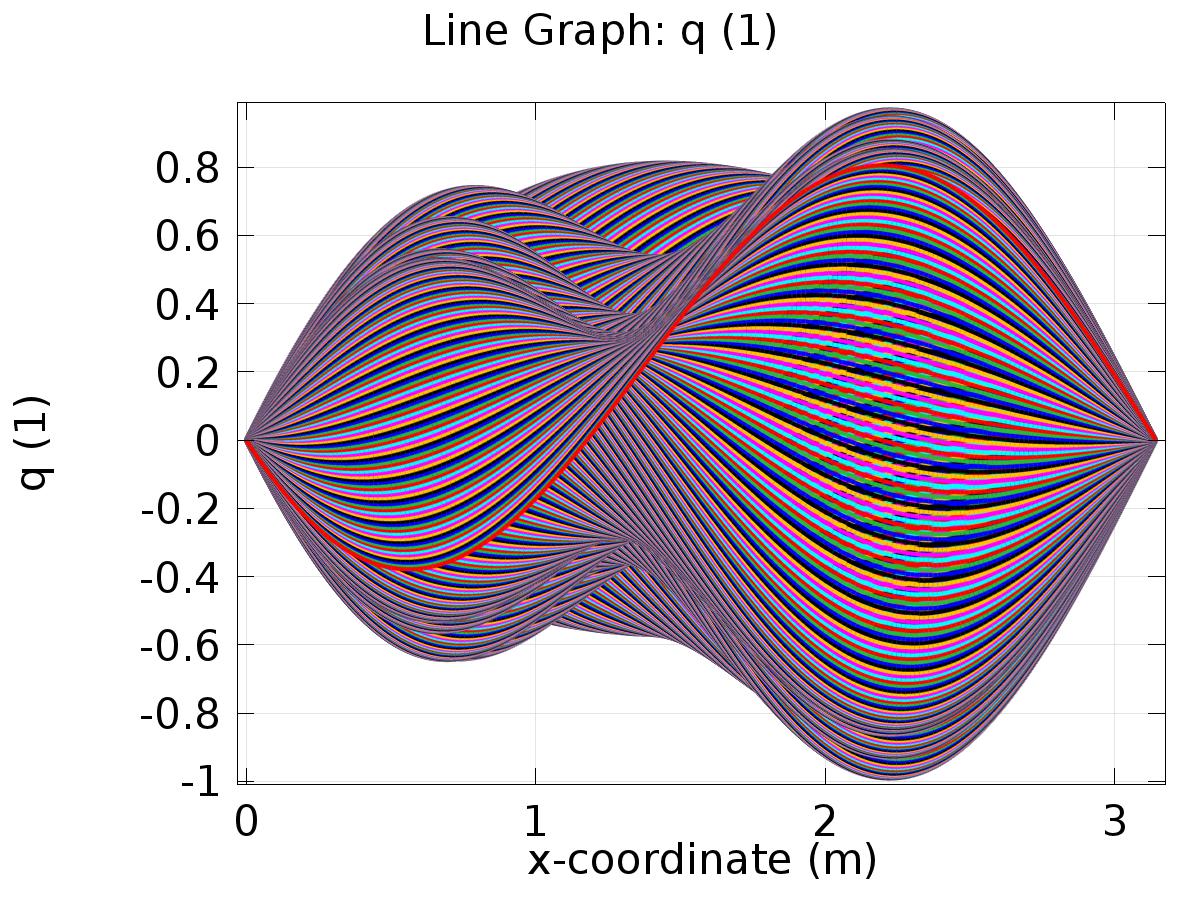
Line Graph: Dependent variable X (1) Line Graph: Gradient of X, x component (1/m)

* + 1. 1D Plot Group 2



Line Graph: Dependent variable PI1 (1) Line Graph: Dependent variable PIt1 (1) Line Graph: Dependent variable PI2 (1) Line Graph: Dependent variable PIt2 (1)

* + 1. 1D Plot Group 3
    2. 1D Plot Group 4



Line Graph: q (1)

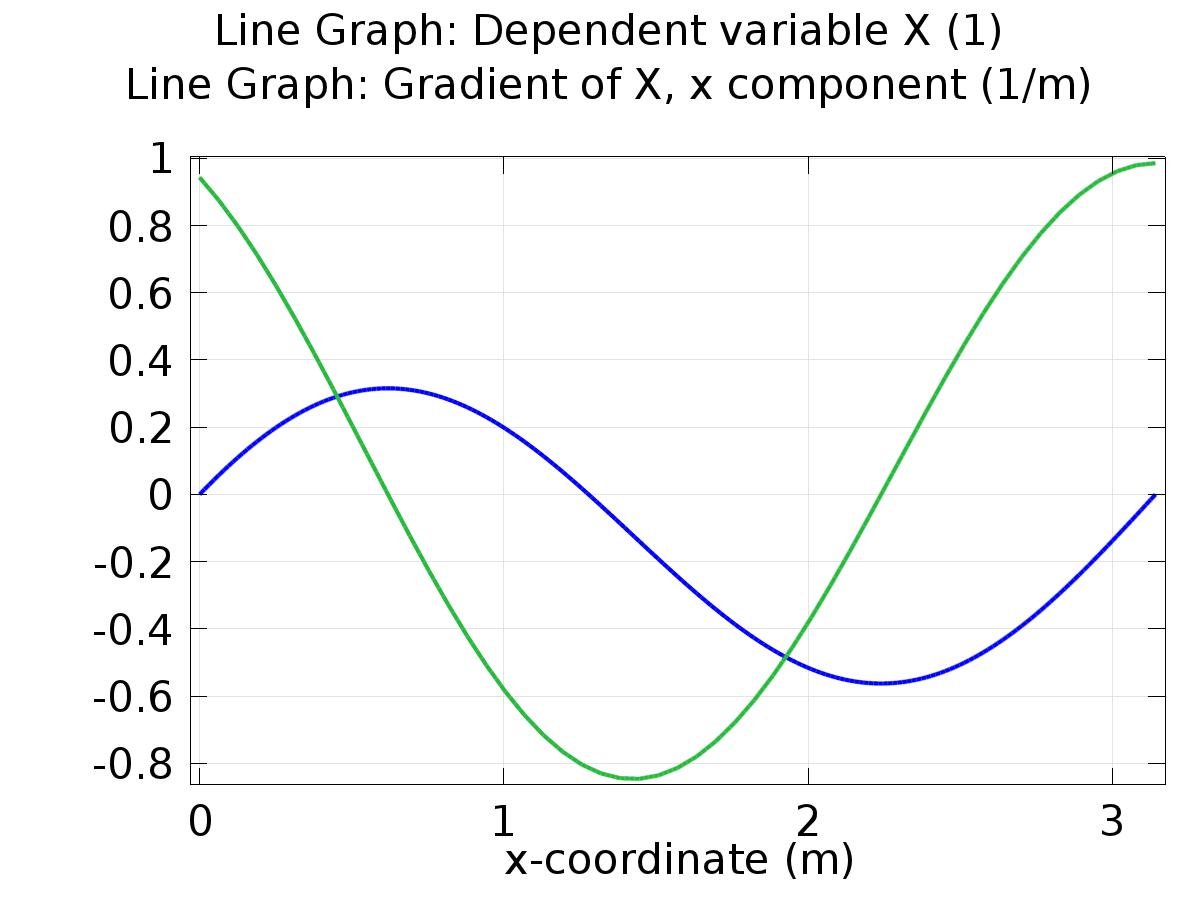
* + 1. 1D Plot Group 1

Line Graph: Dependent variable X (1) Line Graph: Gradient of X, x component (1/m)

* + 1. 1D Plot Group 1

Line Graph: Dependent variable X (1) Line Graph: Gradient of X, x component (1/m)

* + 1. 1D Plot Group 1



Line Graph: Dependent variable X (1) Line Graph: Gradient of X, x component (1/m)