

Package: escape2024 (via r-universe)

May 17, 2026

Title Code accompanying the deliverable D4.1 of the ESCAPE project, 2024

Version 0.0.1

Description The package simulates SEIR epidemics for the mass action model and configuration network model that are described by ordinary differential equations. It contains functionality to calculate theoretical basic reproduction number and final size for the epidemic models. Scripts are included to produce the results presented in the 2024 deliverable D4.1 of the ESCAPE project.

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Encoding UTF-8

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.2

Imports jsonlite, PBSddesolve

Suggests knitr, rmarkdown

VignetteBuilder knitr

Repository <https://jgf5013.r-universe.dev>

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.kernel_capital_curly_f
F(tau) function

Description

F(tau) function

Usage

```
.kernel_capital_curly_f(  
  infection = c("SIR", "SEIR"),  
  transmission_rate,  
  infectiousness_rate = NULL,  
  recovery_rate,  
  tau  
)
```

Arguments

infection

.kernel_capital_curly_f_derivative
Derivative F'(tau)

Description

Derivative F'(tau)

Usage

```
.kernel_capital_curly_f_derivative(  
  infection = c("SIR", "SEIR"),  
  transmission_rate,  
  infectiousness_rate = NULL,  
  recovery_rate,  
  tau  
)
```

Arguments

infection

.kernel_captial_curly_f_inf_limit
Title

Description

Title

Usage

```
.kernel_captial_curly_f_inf_limit(  
  infection = c("SIR", "SEIR"),  
  transmission_rate,  
  infectiousness_rate = NULL,  
  recovery_rate  
)
```

Arguments

recovery_rate

.ode_model_network_seir

Title

Description

Title

Usage

`.ode_model_network_seir(t, current_state, params)`

Arguments

params

.ode_model_network_sir

Title

Description

Title

Usage

`.ode_model_network_sir(t, current_state, params)`

Arguments

params

.ode_model_reference *Title*

Description

Title

Usage

`.ode_model_reference(t, current_state, params)`

Arguments

params

final_size	<i>Title</i>
------------	--------------

Description

Title

Usage

```
final_size(.data, precision = 1e-06)
```

Arguments

precision

helper_g_function	$G'(x) / G'(1) = G'(x) / , = \text{mean degree, } G(x) \text{ probability generating function}$
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Description

$G'(x) / G'(1) = G'(x) / , = \text{mean degree, } G(x) \text{ probability generating function}$

Usage

```
helper_g_function(x, ...)
```

Arguments

...

helper_g_function_derivative	<i>Derivative of helper_g_function $G''(x) / G'(1) = G''(x) / , = \text{mean degree, } G(x) \text{ probability generating function}$</i>
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Description

Derivative of [helper_g_function](#) $G''(x) / G'(1) = G''(x) / , = \text{mean degree, } G(x) \text{ probability generating function}$

Usage

```
helper_g_function_derivative(x, ...)
```

Arguments

...

initial_x	<i>Title</i>
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Description

Title

Usage

initial_x(seed_infected, degree_params)

Arguments

degree_params

mean_degree	<i>Title</i>
-------------	--------------

Description

Title

Usage

mean_degree(...)

Arguments

...

mean_excess_degree	<i>Title</i>
--------------------	--------------

Description

Title

Usage

mean_excess_degree(.degree)

Arguments

.degree

model_network	<i>Title</i>
---------------	--------------

Description

Title

Usage

```
model_network(  
  degree_distribution = c("poisson", "negative_binomial", "constant", "geometric"),  
  infection = c("SIR", "SEIR"),  
  transmission_rate = 1.25,  
  infectiousness_rate = 0.25,  
  recovery_rate = 0.2,  
  time_end = 400,  
  increment = 1,  
  population_size = 2e+07,  
  seed_infected = 0.001,  
  ...  
)
```

Arguments

...

model_network_seir	<i>Title</i>
--------------------	--------------

Description

Title

Usage

```
model_network_seir(  
  degree_distribution = c("poisson", "negative_binomial", "constant", "geometric"),  
  transmission_rate = 0.25,  
  infectiousness_rate = 0.1,  
  recovery_rate = 0.25,  
  population_size = 2e+07,  
  seed_infected = 0.001,  
  ...  
)
```

Arguments

...

model_network_sir	<i>Title</i>
-------------------	--------------

Description

Title

Usage

```

model_network_sir(
  degree_distribution = c("poisson", "negative_binomial", "constant", "geometric"),
  transmission_rate = 0.25,
  recovery_rate = 0.25,
  population_size = 2e+07,
  seed_infected = 0.001,
  ...
)

```

Arguments

...

model_reference	<i>Title</i>
-----------------	--------------

Description

Title

Usage

```

model_reference(
  transmission_rate = 0.25,
  infectiousness_rate = 0.25,
  recovery_rate = 0.2,
  population_size = 2e+07,
  seed_infected = 0.001
)

```

Arguments

seed_infected

models_combined	<i>Title</i>
-----------------	--------------

Description

Title

Usage

```
models_combined(time_end, increment, params_p, params_nb, params_reference)
```

Arguments

params_reference

probability_generating_function	<i>Title</i>
---------------------------------	--------------

Description

Title

Usage

```
probability_generating_function(x, ...)
```

Arguments

...

simulate_outbreak_seir_network	<i>Title</i>
--------------------------------	--------------

Description

Title

Usage

```
simulate_outbreak_seir_network(t, increment, current_state, params)
```

Arguments

params

simulate_outbreak_seir_reference
Title

Description

Title

Usage

```
simulate_outbreak_seir_reference(t, increment, current_state, params)
```

Arguments

params

simulate_outbreak_sir_network
Title

Description

Title

Usage

```
simulate_outbreak_sir_network(t, increment, current_state, params)
```

Arguments

params

theory_network_final_size
Title

Description

Title

Usage

```
theory_network_final_size(.params, .degree, .infection, .fraction = TRUE)
```

Arguments

.fraction

theory_network_growth_rate
Title

Description

Title

Usage

theory_network_growth_rate(.infection, .params, .degree)

Arguments

.degree

theory_network_reproduction_number
Title

Description

Title

Usage

theory_network_reproduction_number(.infection, .params, .degree)

Arguments

.degree

theory_reference_final_size
Title

Description

Title

Usage

theory_reference_final_size(.params = NULL, r_0 = NULL, .fraction = TRUE)

Arguments

r_0

theory_reference_growth_rate
Title

Description

Title

Usage

theory_reference_growth_rate(.params)

Arguments

.params

theory_reference_reproduction_number
Title

Description

Title

Usage

theory_reference_reproduction_number(.params)

Arguments

.params

var_degree *Title*

Description

Title

Usage

var_degree(...)

Arguments

...

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