graph_ricci_curvature

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ONE

GRAPH_RICCI_CURVATURE

1.1 graph_ricci_curvature package

1.1.1 Submodules

1.1.2 graph_ricci_curvature.graph_metric module

class graph_ricci_curvature.graph_metric.**GraphMetric**(*G: Graph*, *weight_key*)

Bases: ABC

Parent class for classes calculating properties of a graph

Parameters

G
[networkx graph] Input graph

weight_key
[str] key to specify edge weights in networkx dictionary

1.1.3 graph_ricci_curvature.ollivier_ricci_curvature module

References:

- Ollivier, Y. 2009. "Ricci curvature of Markov chains on metric spaces". Journal of Functional Analysis, 256(3), 810-864.
- Sandhu et al. 2015. "Graph Curvature for Differentiating Cancer Networks". Scientific Reports. DOi: 10.1038/srep12323

class graph_ricci_curvature.ollivier_ricci_curvature.**OllivierRicciCurvature**(*G: Graph*, *weight_key='weight'*)

Bases: *RicciCurvature*

Class for calculating Ollivier Ricci Curvature

Parameters

G
[networkx graph] Input graph

weight_key
[str] key to specify edge weights in networkx dictionary.

`calculate_edge_curvature`(*source_node*, *target_node*, *alpha=0.5*)

Calculate value of Ricci Curvature tensor associated with an edge between a source and target node defined as

1 - (Wasserstein 1 Distance / Edge Weight)

Parameters

source_node
[int or tuple] index of source_node in graph self.G

target_node
[int or tuple] index of target node in graph self.G

alpha
[float] hyperparameter (0 <= alpha <=1) determining how much mass to move from node

Returns

curvature
[float] value of curvature tensor

`calculate_ricci_curvature`(*alpha=0.5*, *norm=True*)

Calculate nonzero values of Ricci curvature tensor for all edges in graph self.G

Parameters

alpha
[float] hyperparameter (0 <= alpha <=1) determining how much mass to move from node

norm
[bool] if True, normalize nodal scalar curvature

Returns

self.G
[networkx graph] Returns graph with ricci_curvature as node and edge attributes

1.1.4 graph_ricci_curvature.ricci_curvature module

class graph_ricci_curvature.ricci_curvature.**RicciCurvature**(*G: Graph*, *weight_key*)

Bases: *GraphMetric*

Class for storing information about the Ricci Curvature Tensor

Parameters

G
[networkx graph] Input graph

weight_key
[str] key to specify edge weights in networkx dictionary. Default = weight

1.1.5 Module contents

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