GEOMETRIC NETWORKS

M HAMZA WAHLA COURSE OF GEO-DATABASE DEPARTMENT OF GEO-INFORMATICS

A NETWORK MAY BE

AN ARRANGEMENT OF INTERSECTING HORIZONTAL AND VERTICAL LINES

A GROUP OR SYSTEM OF INTERCONNECTED PEOPLE OR THINGS.

Types of Networks

Dentritic networks



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Geometric Networks

A geometric network is a set of connected edges and junctions, along with connectivity rules.

 E.g., A water network consisting of water mains, valves, pump stations etc.

 Arc-Catalog or Arc-Tool
 Box can be used to build geometric networks.



Edges and Junctions

- A geometric network consists of edge network features and junction network features.
- Edges are network features similar to simple line features. E.g., water mains.
- Junctions are network features similar to simple point features. E.g., valves.
- Edge Edge connectivity is built through junctions

• Junction

Edae

While creating a geometric network in your arc-catalog you will encounter following terminologies

Simple and Complex features Simple Edges are always connected to exactly two junctions, Build Geometric Network Wizard Do you want complex edges in your network? one at each end. Edges can be attached to a complex edge without splitting the complex edge. Complex Edges are • No C Yes always connected to Select the feature classes you want built as complex edges: dges at least two junctions at Select All Clear All their endpoints but can be connected to Next > Help Cancel < Back additional junctions along their length.

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snapping

 Snapping is a process moving features.
 For example making line ends and junctions coincide.

 Snap tolerance defines the maximum distance a network feature could be moved.

Snapping



Geometric Network W	rizaro	_	
Do your fea	ntures need to be	snapped?	
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Snap tolerance:			
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Select the features that	can be moved:		
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Sources and Sinks

Sources and Sinks are used to define the flow direction in the network.

- Sources are junctions that push the flow away from themselves.
- Sinks are junctions that pull flow towards themselves.
- An attribute called 'Ancillary Role' defines whether a junction is source or sink.





Does your network have sources or sinks?

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Sources and sinks determine flow direction in a network. A source is where all flow originates and a sink is where all flow ends.

No

O Yes

Select which feature classes contain sources or sinks:

		Select
		Clear
Show Unavailable Feature Classes	Show Unavailable	

Flow Direction

■ Attributes of Junctions1

The flow direction is based on the source and sink

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Flow types

- Determinate flow occurs in as edge if a unique flow direction can be assigned.
 - E.g. A dendritic stream network.
- Indeterminate flow direction occurs in an edge if the flow direction is not unique.
 - E.g. A transportation network.
- Uninitialized flow direction occurs when the flow in a edge is not influenced by sources and sinks.
 - E.g. A stream network with sources and sinks not defined

Network weights

- A weight can be defined as the cost for traversing an element in the network.
 - E.g., pressure loss (per unit length) due to friction in the pipe.
- Many to zero or many to one relationships exist between attributes and network weights



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Enabled and Disabled features

- Features in a network can be enabled or disabled.
- Disabled features act as barriers to flow, whereas enabled features allow the flow to path through.
 - E.g., due to maintenance of a pipe in the network, it may be disabled temporarily.

🗶 Build Geometric Network Wizard	×
Do you want to preserve existing enabled values?	
All network features are initially enabled unless they belong to a feature class that has a field called Enabled".	
C No	
Enable all network features. This will disregard any attribute values in the field called Enabled.	
(F Yes	
Preserve existing attribute values in the field called "brabled". Small attribute values in that field will be result to the enabled state.	
Help Cance	

FID	Shape*	DBJECTID	Enabled
	9 Point	4240	1
	1 Point	4258	1
	2 Point	4269	1
	3 Point	4295	1
	4 Point	4305	1
	5 Point	4318	1
1	6 Point	4343	া
	7 Point	4344	1
1	5 Point	4347	1
	9 Point	4351	1
1	0 Point	4362	1
1	1 Point	4374	1
1	2 Point	4173	1
1	3 Point	4174	0

Now the demo