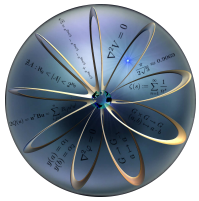

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valency

Canonical name	Valency
Date of creation	2013-03-22 15:10:17
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Entry type	Definition
Classification	msc 05C40
Synonym	valence
Synonym	degree
Defines	ρ-valent
Defines	trivalent graph
Defines	cubic graph
Defines	regular
Defines	regular graph

In a graph, multigraph, or pseudograph G, the **valency** of a vertex is the number of edges attached to it (note that a loop counts twice).

Synonymous with and . There are some unrelated things also called valence; there are of course many things all called degree.

For directed graphs, **in-** and **out-** are prefixed to any of the synonyms, to count incoming and outgoing edges separately.

If $\rho(\mathrm{v})$ is used for the valency of vertex v, the notation $\rho(G)$ (or ρ on its own if there is no scope for confusion) denotes the maximum valency found in graph G. Another notation often seen is $\delta(G)$ and $\Delta(G)$ for lowest and highest valency in G respectively.

If the valency is the same number (ρ, say) for all its vertices, G is called **regular**. More specifically it is called **ρ-valent** or ρ-regular. Connected (components of)...

- ... 0-valent graphs are edgeless vertices,
- ... 1-valent graphs are pairs of vertices joined by an edge,
- ... 2-valent graphs are cyclic graphs, i.e. n-gons, of various sizes
- From $\rho \geqslant 3$ these structures start getting more interesting. 3-valent (or **trivalent**) graphs are also known as **cubic graphs**.

A ρ-valent graph with n vertices has $n\,\rho/2$ edges.