**Gustafson's Law:** Gustafson's Law is a principle in parallel computing that provides an optimistic perspective on the scalability of parallel algorithms. Unlike Amdahl's Law, which focuses on the limitation imposed by the non-parallelizable portion of a program, Gustafson's Law looks at the potential benefits of parallelization when the problem size increases.

Gustafson's Law suggests that as the size of a problem (or dataset) increases, the portion of the program that can be parallelized (the parallelizable fraction) becomes more significant compared to the non-parallelizable portion. In other words, when we work with larger problems, the impact of the sequential portion becomes less significant in relation to the overall execution time.

This is often expressed using the formula:

*S*=*P*+*N*⋅(1−*P*)

Where:

* S is the speedup of the program.
* P is the proportion of the program that can be parallelized.
* N is the number of processors.

In Gustafson's Law, the focus is on how speedup scales with problem size (increasing N), assuming that the parallelizable portion of the program can be scaled up to handle larger datasets efficiently.

In summary, Gustafson's Law provides a more optimistic view of parallelization, suggesting that as problem size increases, parallel computing can still offer significant performance benefits by efficiently handling larger workloads. It's often contrasted with Amdahl's Law, which emphasizes the limitation imposed by the non-parallelizable part of a program.