**Recursive Approach to the Design of a Parallel Self-Timed Adder**

**Abstract**

This brief presents a parallel single-rail self-timed adder. It is based on a recursive formulation for performing multibit binary addition. The operation is parallel for those bits that do not need any carry chain propagation. Thus, the design attains logarithmic performance over random operand conditions without any special speedup circuitry or look-ahead schema. A practical implementation is provided along with a completion detection unit. The implementation is regular and does not have any practical limitations of high fanouts. A high fan-in gate is required though but this is unavoidable for asynchronous logic and is managed by connecting the transistors in parallel. Simulations have been performed using an industry standard toolkit that verify the practicality and superiority of the proposed approach over existing asynchronous adders.

**Tools:**

**Dsch**-for schematic

**Microwind**-for layout