

AN EFFICIENT GENETIC ALGORITHM FOR CHANNEL ROUTING WITH CROSSTALK CONSTRAINT

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ABSTRACT

THE INTERCONNECTION SPACING IN A VLSI CHIP BECOMES DENSER AS THE VLSI FABRICATION TECHNOLOGY RAPIDLY EVOLVES. THIS MAKES THE EFFECT OF CROSSTALKS ON PERFORMANCE AND EVEN ON YIELD IN VLSI DESIGN AND MANUFACTURING INCREASE. THE INCREASE OF CROSSTALKS WILL LEAD TO CIRCUIT DELAY, UNEXPECTED CIRCUIT BEHAVIOR AND THE DECREASE OF YIELD. CONSEQUENTLY, REDUCTION OF CROSSTALKS BETWEEN INTERCONNECTION WIRES BECOMES MORE AND MORE IMPORTANT IN TODAY'S VLSI DESIGN. IN THIS PAPER, WE PROPOSE A NOVEL ALGORITHM, CALLED THE GACR (GENETIC ALGORITHM FOR CROSSTALK REDUCTION) ALGORITHM, FOR THE GRID-BASED CHANNEL ROUTING PROBLEMS WITH CROSSTALK CONSTRAINT. OUR APPROACH IS BASED ON GENETIC ALGORITHM AND HENCE THE SELECTION, CROSSOVER AND MUTATION OPERATORS WHICH ARE THE BASE OPERATORS OF GENETIC ALGORITHM ARE APPLIED TO GENERATE NEW CROSSTALK-REDUCED ROUTING SOLUTIONS. EXPERIMENTAL RESULTS SHOW THAT OUR RESULTS ARE BETTER THAN OR COMPETITIVE TO THE KNOWN BEST RESULTS.

Keywords : CROSSTALK, CHANNEL ROUTING, GENETIC ALGORITHM

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