THE STUDY OF IC PROCESS FAULT DETECTION

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ABSTRACT

THE EVOLUTION OF SEMICONDUCTOR MANUFACTURING PROCESS ON THE ENLARGEMENT OF WAFER SIZE TOGETHER WITH THE SHRINK OF FEATURE SIZE RESULTS IN THE DIFFICULTY OF PROCESS CONTROL. IN ADDITION FAULTY PROCESSES RELATIVELY INCREASE.TIGHT PROCESS CONTROL THEN BECOMES AN ESSENTIAL REQUIREMENT IN THE FABS.UP TO THE PRESENT SPC HAS BEEN USED AS A TOOL FOR QU -ALITY CONTROL.HOWEVER MANY PROCESS PARAMETERS EXHIBIT CORRELATED RELATIONSHIP AND INE -VITABLE STEADY DRIFT. USING SPC CONTROL CHARTS SOMETIMES LEADS TO FALSE ALARMS AND ERR -ONEOUS JUDGMENTS.THEREFORE THE MAJOR MOTIVATION OF THIS RESEARCH IS TO LEARN THE CHAR -ACTERISTICS OF THESE PROCESS VARIATIONS BY USING RADIAL BASIS FUNCTION (RBF) NEURAL NE -TWORKS.EQUIPMENT MALFUNCTION AND/OR THE FAULTS CAN THUS BE DETECTED AND THE FALSE ALAR -MS CAN BE AVOIDED. FURTHERMORE THE MAINTENANCE CAN BE PERFORMED BASED ON OUR PROVIDED DIAGNOSIS FUNCTION IN ORDER TO PROMOTE THE OVERALL EQUIPMENT EFFECTIVENESS. RADIAL BASIS FUNCTION NEURAL NETWORKS HAVE THE CAPABILITY OF PARALLEL COMPUTATION.THE NEURAL NETWORKS ARE TRAINED BY THE INPUT-OUTPUT DATA SO THAT THE INTERNAL WEIGHTS OF NE -TWORKS CAN BE OBTAINED. THE CONSTRUCTED NON-LINEAR MODELS HAVE CHARACTERISTICS OF CURV -E FITTING AND MAPPING RELATIONS. RBF NETWORKS CAN PROVIDE GENERALIZATIONS WITH MINIMUM STRUCTURES.THEREFORE THEY ARE APPLICABLE TO THE COMPLICATED SYSTEMS,ESPECIALLY FOR THE PURPOSES OF FAULT DETECTION AND CLASSIFICATION.

Keywords: RADIAL BASIS FUNCTION NEURAL NETWORKS FAULT DETECTION STATISTICAL PROCESS CONTROL

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