EDA简介（Introduction of EDA）

EDA in the communications industry (telecom) another explanation is that the enterprise data architecture, EDA gives an overall view of enterprise data architecture, and according to the characteristics of telecommunications enterprises, the framework and hierarchy. EDA is the Electronic Design Automation (Electronic Design Automation), in the mid - 1960 - s from computer aided Design (CAD), computer aided manufacturing (CAM), computer aided test (CAT) and computer aided engineering (CAE), the concept of development.

directory

4. EDA tool software manufacturer 3

V. compound

6. Exploratory data analysis

7. Distribution estimation algorithm

To edit this section, what is EDA

In the 1990 s, the international electronic and computer technology more advanced countries, has been actively exploring new methods of electronic circuit design, and the design methods, tools, etc, made a thorough change, has been a huge success. In the field of electronic technology design, the application of programmable logic devices (such as CPLD and FPGA) has been widely popularized, and these devices give great flexibility to the design of the digital system. These devices can be programmed by software to reconstruct their hardware structure and way of work, so that the hardware design can be as convenient and fast as software design. This has greatly changed the traditional digital system design method, design process and design concept, promoted the rapid development of EDA technology. EDA technology is the computer as the tool, the designer on the EDA software platform to complete the design with VHDL hardware description language file, and then by the computer automatically complete logic compilation, reduction, segmentation, integration, optimization, simulation, layout, wiring, and until the fit for a

particular target chips compilation, logical mapping and programming downloads, etc. The emergence of EDA technology greatly improves the efficiency and maneuverability of circuit design and reduces the labor intensity of designers. Using EDA tools, electronic stylist can start design from concept, algorithm, agreement and other electronic systems, a lot of work can be done through the computer, and electronic products can be from circuit design and performance analysis to design the IC territory or PCB layout the whole process of computer automatic processing is completed. The concept or category of EDA is now widely used. It includes the application of EDA in mechanical, electronic, communications, aerospace, chemical, mineral, biological, medical, military and other fields. At present EDA technology has been widely used in various companies, enterprises and institutions and research and teaching departments. In aircraft manufacturing, for example, EDA may be involved in design, performance testing, and performance analysis until flight simulation. EDA technology, the concept of EDA technology refers to computer for working platform, shirt-sleeve application of electronic technology, computer technology, information processing and the latest achievements of intelligent technology, the automatic design of electronic products. Using EDA tool,

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Edit this paragraph 2, design method

(1) front-end design (system modeling RTL level description) back-end design (FPGAASIC) system modeling (2) IP reuse (3) front-end design (4) system description: establish a mathematical model of the system. (5) functional description: describe the behavior of the system or the data flow diagram between each sub-module. (6) logical design: structuring the system, usually in terms of text, schematic, logical, and Boolean expressions. (7) simulation: including function simulation and timing simulation, the correctness of the system function is mainly verified.

Edit this paragraph 3, EDA tool software

classification

EDA tool software can be divided into three categories: chip design support software, programmable chip assist design software, and system design support software. To enter our country at present and has extensive influence of EDA software is auxiliary class and programmable chip system design software aided design software: Protel, Altium Designer, PSPICE software multiSIM10 (the latest version of EWB), OrCAD, PCAD, LSIIogic, MicroSim, ISE, modelsim, Matlab, etc. These tools has strong function, generally can be used in several aspects, such as a lot of software can be circuit design and simulation, and into the PCB layout automatically, and can output various netlist file with the third party software interface. The following is a brief introduction to circuit design and simulation tools, PCB design software, IC design software, PLD design tools and other EDA software. 3.1 electronic circuit design and simulation tools we may all have used test boards or other things to make some electronic manufacturing practices. But sometimes, we find that there are a lot of problems to be made, and we don't think about it in advance, which wastes a lot of our time and materials. It also increases the product's development cycle and continues the product launch time, thus losing the market competitive advantage. Is there a way to know the results without using a soldering iron test board? The conclusion is that this is the circuit design and simulation technology. When it comes to the technology of electronic circuit design and simulation, we can't talk about America,

I can't help but mention why their airplane designs are so

efficient. Previously, the design of a medium-sized aircraft was designed, from the draft to detailed design to wind tunnel test and finally to the actual production, the whole period would be about 10 years. And the United States is one year. Why the big gap? Because the United States is most used in the design of virtual simulation technology, the years of accumulation of wind tunnel experimental parameters in input computer, and then write a virtual environment through computer programming software, and enable it to automatically apply related formula and call after long-term accumulation of experience parameters of input computer. In this way, as long as the appearance of the plane meter data into the virtual wind tunnel test software, where there is something wrong with the unreasonable changes there, until the best effect, high efficiency nature, finally in a real environment test several times again look for less than can finalize the design, from the Boeing 747 to F16 are using this method. Aerodynamic data provided by senior experts, software developers is IBM, aircraft design engineer just using simulation software on the computer platform for all kinds of simulation debugging. Similarly, many of their other things are used in a similar way, from big to small, from complex to simple, even including designing furniture and composing music, except for specific software content. In fact, they invented the first generation of computers (originally designed to efficiently design cannons and projectiles and other computationally large designs). Electronic circuit design and simulation tools include SPICE/PSPICE; MultiSIM7; Matlab; SystemView; MMICAD LiveWire, Edison, Tina Pro Bright Spark, etc. Here's a

quick introduction to the first three. (1) the SPICE Simulation Program with Integrated Circuit Emphasis), was launched by the university of California Circuit analysis Simulation software, is the world's most widely used in the 1980 s Circuit design software, and in 1998 was designated as the national standards. In 1984, MicroSim introduced the SPICE based microcomputer version of Personal SPICE. It is now used more PSPICE6.2, which can be said to be the most powerful analog and digital circuit hybrid emulation EDA software in similar products, which is widely used in China. The latest release of PSPICE9.1. It can build all kinds of circuit simulation, motivation, temperature and noise analysis, analog control, waveform output, the output data, and in the same window shows both analog and digital simulation results. No matter which circuit is simulated by which circuit, the accurate simulation result can be obtained, and the component and component library can be built by itself. MultiSIM (latest version of EWB) software: Interactive Image Technologies Ltd launched the circuit simulation software in the late 20th century. MultiSIM7 its latest version, it is used widely in multiSIM2001, relative to other EDA software, it has more image intuitive human-computer interaction interface, especially the instrument in the library each instrument with the actual operating the real experiment instrument is completely different,

But its mix of analog circuit simulation function is no less, can almost 100% to the simulation results of the real circuit, and it's on the instrument in the library also provides a multimeter, signal generator, wattmeter, double trace oscilloscope (for multiSIM7 also has four trace

oscilloscope), potter instrument (in the actual frequency sweep meter), signal generator, logic analyzer, logic conversion apparatus, distortion analyzer, spectrum analyzer, network analyzer and the voltmeter and ammeter instruments and meters, etc. We also provide a variety of modeling precision components, such as resistance, capacitance, inductance, triode, diode, relay, thyristor, digital tube, etc. There are various operational amplifiers and other common integrated circuits in analog integrated circuits. Digital circuits have 74 series of integrated circuits, 4000 series integrated circuits, and so on. MultiSIM7 also has an i-v analyzer (a transistor feature in the real environment) and Agilent signal generator, Agilent multimeter, Agilent oscilloscope and dynamic logic pen, etc. It also carries out VHDL simulation and Verilog HDL simulation. (3) the MATLAB product family: they are one of the main features are oriented toward the many specific application toolkit and simulation block, contains the complete set of functions for image signal processing, control system design, the application of neural network and other special analysis and design. It has functions such as data collection, report generation and MATLAB programming to generate independent C/C + + code. MATLAB product family has the following functions: data analysis; Numerical and symbolic computation, engineering and scientific drawing; Control system design; Digital image signal processing; Financial engineering; Modeling, simulation, prototype development; Application development; Graphical user interface design, etc. MATLAB products are widely used in many fields such as signal and image processing, control system design and communication system

simulation. The open architecture makes it easy for MATLAB product families to expand on specific needs, so as to deepen their understanding of the problem and improve their competitiveness. 3.2 PCB design software PCB (Printed Circuit Board) design software is a lot of more phyletic, such as Protel, Altium Designer, OrCAD, Viewlogic, PowerPCB, Cadence PSD, MentorGraphices Expedition of PCB, Zuken CadStart, Winboard/Windraft/Ivex - SPICE, PCB Studio, TANGO, PCBWizard (with LiveWire PCB production package), ultiBOARD7 (with multiSIM2001 PCB production packages) and so on. At present in our country, we use most of it as Protel, and here is a description of the software. Protel, a CAD tool introduced by Protel (now Altium) in the late 1980s, is the preferred software for PCB designers. It has the highest penetration rate in China and has the highest penetration rate in the country. In many large and secondary vocational colleges, it is specialized in the courses of Protel, which is used by almost all the circuit companies. Early Protel was mainly used as a printing board automatic wiring tool, and the latest version was Altium Designer 10, which is now commonly used in Protel99SE,

System, it is a complete all-round circuit design includes the electrical schematic drawing, mixed signal analog circuit and digital circuit simulation, multilayer printed circuit board design (including PCB layout automatically), programmable logic devices design, graphics generation, generating circuit form, support of macro functions such as operation, and Client/Server (Client/Server architecture), and also design software is compatible with some other file formats, such as ORCAD PSPICE software, EXCEL, etc. Use

multi-layer printed circuit board automatic wiring, can realize the high density PCB 100% butong rate. Protel software is powerful (both circuit simulation and PLD development), interface friendly and easy to use, but it is most representative of circuit design and PCB design. There are many IC design tools for IC design software, including Cadence, Mentor Graphics and Synopsys according to market share. All three are well-known software vendors in the design field of ASIC. Other companies' software is relatively small. China huada corporation also offers ASIC design software (panda 2000). Another recent famous Avanti company, was founded originally in the Cadence of a few Chinese engineers, they design tools can be comprehensive and Cadence tool, very suitable for deep submicron IC design. The following is a brief introduction to IC design software. This is the basic function that any EDA software must have. Like Cadence's composer, viewlogic's viewdraw, hardware description language VHDL, Verilog HDL is the main design language, and many design input tools support HDL (such as multiSIM, etc.). Also like the design of the Active - HDL and other input methods, including principle and state machine input method, the design of FPGA/CPLD most tools can be used as input means of IC design, such as Xilinx, Altera company provides development tools Modelsim FPGA, etc. One of the biggest advantages of designing simulation work using EDA tool is that it can verify that the design is correct, and almost every company has a simulation tool for the EDA product. The Verilog - XL, NC - Verilog is used for Verilog simulation, Leapfrog is used for VHDL simulation, and Analog Artist is used to simulate circuit simulation. Viewlogic's emulator has: viewsim gate

level circuit emulator, speedwaveVHDL emulator, vs-verilog emulator. Mentor Graphics has a VHDL and Verilog dual simulator from its Model Tech. Cadence and Synopsys are VSS (VHDL emulators). The current trend is that the large EDA companies are gradually using HDL emulators as tools for circuit validation. The comprehensive tool kit can turn HDL into a men-level grid. The Synopsys tool has a big advantage in this aspect, and its Design Compile is a comprehensive industrial standard. It also has another product called Behavior Compiler, which can provide more advanced synthesis. Another recent American software, called Ambit, is said to be more effective than Synopsys's software, which can synthesize half a million circuits faster.

Earlier this year, Ambit was acquired by Cadence and Cadence gave up its original synthetical software Synergy. As the scale of the FPGA design is more and more big, the EDA companies and developed a comprehensive software for the FPGA design, is the famous are: Synopsys FPGA Express, Cadence Synplity, Mentor Leonardo, the three integrated FPGA software accounted for the vast majority of the market. The layout and wiring of the layout of the layout of IC design, Cadence software is strong, it has a lot of products, used for standard unit, gate array can realize interactive wiring. The most famous is Cadence spectra, which was originally used for PCB wiring, which Cadence later used as a wiring for IC. The main tools are: Cell3, Silicon Ensemble - standard unit wiring device; Gate Ensemble - door array wiring device; Design Planner - layout tool. Other EDA software development companies also

offer their own layout tools. The physical validation tool of the physical verification tool includes the map design tool, map verification tool, map extraction tool, and so on. Cadence is also strong in this area, and there are many users of the physical tools such as Dracula, Virtuso, and Vampire. The simulators of the simulation circuit are mainly aimed at digital circuits, which are the only choice for analog circuit simulation tools. Just choose different companies' SPICE, such as MiceoSim's PSPICE, Meta Soft's HSPICE and so on. HSPICE is now bought by Avanti. In many SPICE, HSPICE is the IC design, its model is much, the accuracy of simulation is also high. The 33.4 PLD design tool, the Programmable Logic Device, is a digital integrated circuit that users construct logical functions based on their needs. There are currently two major types: CPLD (Complex PLD) and FPGA (Field Programmable Gate Array). The basic design method is with the aid of EDA software, with the schematic diagram, state machine, the Boolean expression, methods of hardware description language, generate the corresponding target file, with programmer or download cable, finally implemented by the target device. There are many manufacturers of PLD, but the most representative PLD manufacturers are Altera, Xilinx and Lattice. PLD development tools generally provided by the device manufacturer, however, as the device size increasing, the complexity of software increases, the current used by specialized software company and device manufacturers, the introduction of powerful design software. The following introduces the main components manufacturers and development tools. ALTERA: it has developed very quickly since the 1990s. The main products are: MAX3000/7000,

no large-scale FPGA based on look-up table), launched in 1999, programmable analog device, 1999 acquisition Vantis (former AMD subsidiary), become the third largest supplier programmable logic device. In December 2001, we acquired the FPGA department of Agere (formerly Lucent electronics). The main products are ispLSI2000/5000/8000, and MACH4/5. C. ACTEL: leader of anti-fuse (one-time burn) PLD. Due to anti-radiation, high low temperature, low power consumption and fast speed, anti-fuse PLD has great advantages in military and astronautics. ALTERA and XILINX are generally not involved in military and aerospace markets. The company is a professional PLD/FPGA company, which is mainly used as a disposable anti-fuse technology and has a small sales volume in China. The main feature is a number of dedicated IP cores for communication, but PLD/FPGA is not Lucent's main business, and there are very few people in China. One: small and medium size PLD is good. ATMEL also made some films that are compatible with Altera and Xilinx, but there are still some differences in quality with the original manufacturer, with less use in high-reliability products and more on low-end products. I Clear Logic: the production is compatible with some famous PLD/FPGA large companies. This chip can solidify the user's design once and for all. It is not programmable, and the cost of batch production is low. Nine WSI: production of PSD (single chip microcomputer programmable peripheral chip) products. This is a special PLD, such as the latest PSD8xx, PSD9xx integration of PLD, EPROM, Flash, and support ISP (online programming), high integration level, mainly used to work with single chip microcomputer. It is a common cross-manufacturer development platform for Actel, Altera, Lattice and Xilinx four PLD/FPGA devices. It has recently launched Altium Designer 10 software

to integrate Aldec HDL simulation. By the way: PLD (programmable logic devices) is a kind of 74 series and GAL can replace completely, the PLA's new circuit, as long as there is the digital circuit basis, will use the computer, can be the development of PLD. PLD's online programming capabilities and powerful development software enable engineers to work in a few days, even a few minutes, to complete the work in the past few weeks.

Millions of complex designs can be integrated into one chip. PLD technology has become an indispensable technology for electronic engineers in developed countries. 3.5 other EDA software VHDL language: VHSIC harddeseription Languagt, or VHDL, is a standard design language of IEEE. It comes from the defense department's Very High Speed Integrated Circuit (VHSIC) program, which is a major input tool for ASIC design and PLD design. Veriolg HDL: it is the hardware description language introduced by Verilog, which is equal to the VHDL language in the design of ASIC. Other EDA software, such as tools for microwave circuit design and power carrier tools, PCB production and process control, will not be introduced here. EDA's application EDA plays an important role in teaching, research, product design and manufacturing. In terms of teaching, universities with almost all science and engineering (especially electronic information) have EDA courses. Mainly is to let students understand the basic concept of EDA and basic principle, to master written in HDL language specification, master logic synthesis theory and algorithm, using EDA tools for electronic circuit experiment of the course and is engaged in the design of simple systems. General learning circuit simulation tools (such as multiSIM, PSPICE) and PLD development

tools (such as Altera/Xilinx's device structure and development system) will lay the foundation for future work. The main use of circuit design and simulation using circuit simulation tools (multiSIM or PSPICE). Using virtual instrument for product testing; Practical application of CPLD/FPGA devices to instrument equipment; Engaged in PCB design and ASIC design. In product design and manufacturing, including computer simulation, product development of EDA tools application, the system level simulation and simulation test environment, production line of EDA technology application, product testing and so on each link. Such as PCB production, electronic equipment development and production, circuit board welding, ASIC production process, etc. From the point of application field, EDA technology has penetrated into all walks of life, such as stated above, including in machinery, electronics, communication, aviation navigation aerospace, chemical, mineral, biology, medicine, military and other fields, have EDA application. In addition, EDA software has become increasingly powerful and has a lot of new USES. For example, AutoCAD software can be used for mechanical and architectural design, and also extends to architecture decoration and various renderings, models of cars and aircraft, special effects and other fields. The development trend of 4 EDA technology is based on the current EDA technology, and its development trend is that the government attaches great importance to the development of the technology, and it is widely used, widely used, with various tools and powerful software functions. EDA market has become more mature in China, but most of the design engineer for PCB board system and small field of ASIC, only small part (about 11%) of the designers to develop complex on-chip system devices. In order to compete

better with design engineers in Taiwan and the United States,

It is necessary for China's design team to introduce and learn some of the latest EDA technology. In the field of information and communication, to give priority to development of high-speed broadband information network, deep submicron IC, new components, computer and software technology, the third generation mobile communication technology, information management, information security technology, actively explore on the basis of the digital technology and network technology of a new generation of information product, development of emerging industries, cultivating new economic growth point. To promote the manufacturing informatization, actively carry out computer aided design (CAD), computer aided engineering (CAE), computer aided process (CAPP), computer aided manufacturing (CAM), product data management (PDM), manufacturing resource planning (MRPII) and enterprise resource management (ERP), etc. The qualified enterprises can carry out "network manufacturing", facilitate cooperation design and cooperation, and participate in domestic and international competition. Carry out "numerical control" project and "digital" project. The test technology and control technology of the technology development trend of automation instrument and computer technology and communication technology are further integrated to form measurement, control, communication and computer (M3C) structure. In the design of ASIC and PLD, the development of ultra-high speed, high density, low power consumption and low voltage. The market prospect of the combination of peripheral technology and EDA project is promising, such as the connection of the combination of super-large screens, and the development of multi-screen technology. Since 1995, China has accelerated

the development of the semiconductor industry, established several design centers, and promoted a series of design activities in response to competition from other EDA markets in the asia-pacific region. In the case of EDA software development, the current focus is in the United States. But countries are also trying to develop tools. Japan and South Korea have ASIC design tools, but not open to the outside world. China huada integrated circuit design center, also provides IC design software, but the performance is not very strong. It is believed that more and better design tools will blossom and bear fruit in the near future. China and India are becoming the fastest growing market for electronic design automation, with annual growth rates of 50 per cent and 30 per cent respectively, according to the latest statistics.

4. EDA tool software manufacturer 3

Synopsys, Mentor Graphics, Cadence.

Edit this paragraph 5, compound

Ethylenediamine Ethylene diamine (EDA), or 1, 2-diaminoethane, is an organic compound from the amines group. Its formula is H2N - CH2CH2 - NH2. It is a strongly alkaline, a colorless to yellowish liquid, with amine, she completely miscible with water and soluble in alcohol. Its melting point is 8.5 C and boiling point of 116 C. Its CAS reference number is 107-15-3.

Edit this paragraph 6, exploratory data analysis

The so-called Exploratory Data Analysis (EDA) refers to the

exploration of existing Data, especially the original Data obtained by investigation or observation, under the presupposition of as few prior assumptions as possible.

A data analysis method is used to explore the structure and regularity of data by drawing, tabulating, fitting and calculating characteristic quantity. In particular, exploratory data analysis can be very effective when we do not have sufficient experience with the information in these data and do not know which traditional statistical methods should be used to analyze it. Exploratory data analysis was proposed in the 1960s and was named after John Tukey, a leading American statistician.

Edit the distribution estimation algorithm

EDA Distribution Estimation algorithm (Estimation of Distribution Algorithms is a new evolutionary computation field rise a class of stochastic optimization algorithm, is a research hotspot in the field of current international evolutionary computation. It is a combination of genetic algorithm and statistical learning, by means of statistical learning Distribution of individuals in the solution space of the probability model is set up, and then produces a new group to probability model of random sampling, so repeated, realize the evolution of the group. Distributed Estimation algorithm without the traditional genetic operation such as crossover and mutation, is a kind of brand-new pattern evolution; The optimization technology can pass probability graph model to modeling the relationship between the variables, which can effectively solve the multivariable optimization problem.