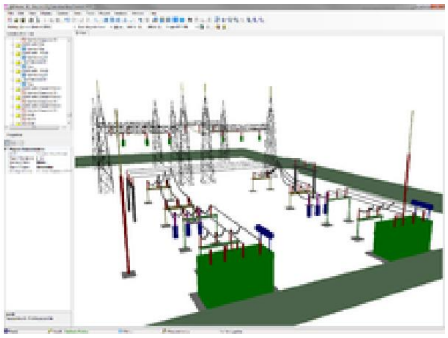
Power engineering software



Analysis software for lightning protection used on a power substation.

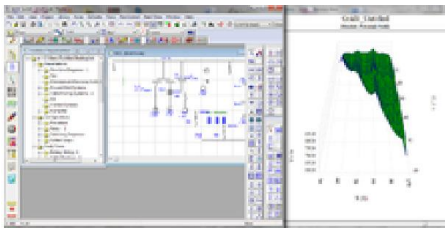
Power engineering software is software used to create models, analyze or calculate the design of Power stations, Overhead power lines, Transmission towers, Electrical grids, Grounding and Lightning[*clarification needed*] systems and others. It is a type of application software which is used for power engineering problems, which are transformed into mathematical expressions.

Contents

History

The first software for power engineering were created in the end of 60s. The first software were created for monitoring power plants. In the next decades the Power engineering and Computer technologies are develop very fast. It were created and software, to collect the data for the power plants.[1] One of the first computer languages,which were used in the Nuclear plants and in the Thermal plants were C (programming language). In the next years the programming language Python were used,to be create algorithms and software programs. In French Nuclear plants one of the most using computer languages is Python. In the end of 80s were developed the first programs and platforms for electrical power modelling.[2]

Power plants analysis software


3D modeling grounding grid

After 2000 begins to develop rapidly analytical programming and 3D modeling. Software products are being created for design power plants and their elements and connections. Programs are based on mathematical algorithms and computations.[3] Power software as ETAP, CYME, DINIS, IPSA, PSS/E and DIgSILENT are pioneers at the category power engineering software. Most of this product used MARKAL, ESME and other modelling methods. The transmission lines be designed according to minimum requirements set out in the SQSS (security and quality of supply standard). This also applies to other elements of the power systems. In the software world,were developed many CAD software products for 2D and 3D electrical design.[4]

Renewable energy controller software

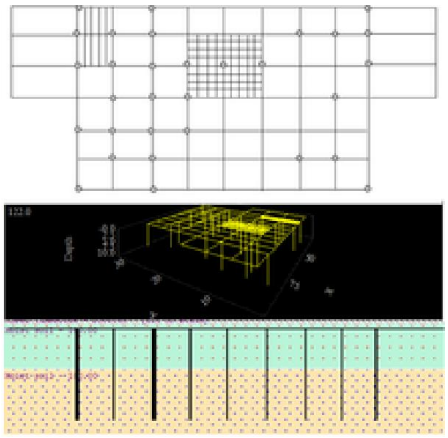
The controllers of Renewable energy used different software. The digital controllers are different types: ADC, DAC, 4-bit, 8-bit, 16-bit, and many others.[5] The controllers most of the time to this date are programmed with computer languages like:C,C++,Java and others.[6]

Software products

System	Creator	Development started	Latest stable version	License	Notes
NEPLAN	NEPLAN AG	1988	10.8.1.2	commercial	Cloud Computing[7], Power System Analysis, Power Management System, Grid Code, Real Time integrations, Transmission and Distribution networks, GIS/SCADA integrations, Asset Management, EMS - DMS
ETAP	Operation Technology, Inc.	1986	19.0.1	commercial	Power System Analysis, Power Management System, SCADA, Transmission & Distribution planning, Geospatial Modeling, ADMS, EMS, Microgrid Controller, Power Plant Controller

System	Creator	Development started	Latest stable version	License	Notes
XGSLab	SINT Ingegneria	2004	7.01	commercial	GSA,GSA FD,XGSA FD,XGSA TD
CYME	CYME International	1986	16.01	commercial	COM Module, Voltage Stability Analysis
SKM	SKM Systems Analysis, Inc	1972	8.0.2.5	commercial	TMS, HI_WAVE, CAPTOR, IEC 60909 Fault, IEE Wiring, A_Fault (ANSI)[8]
DIgSILENT	Dr. Martin Schmieg	1985	2018	commercial	PowerFactory 2018, StationWare 2018, GridCode,
ERACS	RINA Consulting Ltd	1990	3.9.10	commercial	Balanced three-phase power systems analysis modelling tool, which includes Loadflow, Fault / Short-Circuit, Harmonics & G5/4, Protection Co-ordination, Transient Stability and Arc Flash calculation modules.[9]
RSCAD	Manitoba HVDC Research Centre	1986	4.003	commercial	
EMTP-RV	EDF & RTE & Hydro-Québec	1982	3.5	commercial	
PSSE	Siemens	1976		commercial	Steady-state conditions as well as over timescales of a few seconds to tens of seconds

System Analysis


Grounding grid design

The software product are created to solve different problems and to make different analysis of the power engineering.

- Grounding grid analysis
- Power generation analysis
- Transmission line analysis
- Renewable energy analysis
- Distribution system analysis

See also

- Top ten rules for power plant condition monitoring
- Power plants monitoring
- Wind energy software