Automatic SketchUp

Creating 3-D Models in Ruby

Automatic Sketchup Creating 3 D Models In Ruby

Gerro Prinsloo,Robert Dobson

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   Automatic SketchUp Matthew Scarpino,2010-03-08 Google SketchUp has become one of the most popular tools available for three dimensional modeling Its users include architects engineers woodworkers and hobbyists from all across the world Most designers rely on the toolbar and menus but SketchUp provides a programming interface that makes it possible to construct designs with scripts coded in the Ruby language   **Architectural Design with SketchUp** Alexander C. Schreyer,2023-05-26 ARCHITECTURAL DESIGN WITH SKETCHUP The most complete reference for anyone using SketchUp fully updated to cover the latest features with a new chapter on drawing preparation using LayOut This newly updated and revised Third Edition of Architectural Design with SketchUp covers all the topics that students and professionals use daily such as 3D modeling extensions photorealistic rendering and drawing preparation It features more than fifty easy to follow tutorials that first brush up on the basics of the program and then cover many advanced workflows including digital fabrication and scripting offering informative text and full color illustrations side by side to clearly convey the techniques and features any reader needs to excel The leading guide to SketchUp for architects interior designers construction professionals makers and many others Architectural Design with SketchUp is the key resource for students using SketchUp in a course or studio and professionals looking for a thorough desk reference that covers the latest SketchUp features Topics covered in Architectural Design with SketchUp include 3D modeling and design approaches with SketchUp such as conceptual massing geo based modeling component based assemblies point cloud and script based modeling Creating stunning photorealistic renderings and presentation ready illustrations from your SketchUp models and using LayOut for 2D graphics and construction documents Using extensions to enhance SketchUp s core toolset and provide advanced functionality Making physical objects from your designs with common digital fabrication tools such as 3D printing CNC fabrication or laser cutting Differences between SketchUp Pro web and iPad versions and integrating SketchUp into workflows with other BIM software and various Trimble products and services such as Trimble Connect This Third Edition of Architectural Design with SketchUp includes hundreds of full color images that show SketchUp features many example projects and cookbook style approaches to common tasks which is supplemented with additional tutorials and sample files on a companion web site   **Automatic Solar Tracking Sun Tracking Satellite Tracking rastreador solar seguimento solar seguidor solar automático de seguimiento solar** Gerro Prinsloo,Robert Dobson,2015-11-01 Automatic Solar Tracking Sun Tracking This book details Automatic Solar Tracking Sun Tracking Systems Solar Trackers and Sun Tracker Systems An intelligent automatic solar tracker is a device that orients a payload toward the sun Such programmable computer based solar tracking device includes principles of solar tracking solar tracking systems as well as microcontroller microprocessor and or PC based solar tracking control to orientate solar reflectors solar lenses photovoltaic panels or other optical configurations towards the sun Motorized space frames and kinematic systems ensure motion dynamics and employ drive technology and gearing principles

to steer optical configurations such as mangin parabolic conic or cassegrain solar energy collectors to face the sun and follow the sun movement contour continuously seguimiento solar y automatizaci n automatizaci n seguidor solar tracking solar e automa o automa o seguidor solar inseguimento solare inseguitore solare energia termica sole seguito posizionatore motorizzato In harnessing power from the sun through a solar tracker or practical solar tracking system renewable energy control automation systems require automatic solar tracking software and solar position algorithms to accomplish dynamic motion control with control automation architecture circuit boards and hardware On axis sun tracking system such as the altitude azimuth dual axis or multi axis solar tracker systems use a sun tracking algorithm or ray tracing sensors or software to ensure the sun s passage through the sky is traced with high precision in automated solar tracker applications right through summer solstice solar equinox and winter solstice A high precision sun position calculator or sun position algorithm is this an important step in the design and construction of an automatic solar tracking system The content of the book is also applicable to communication antenna satellite tracking and moon tracking algorithm source code for which links to free download links are provided From sun tracing software perspective the sonnet Tracing The Sun has a literal meaning Within the context of sun track and trace this book explains that the sun s daily path across the sky is directed by relatively simple principles and if grasped understood then it is relatively easy to trace the sun with sun following software Sun position computer software for tracing the sun are available as open source code sources that is listed in this book The book also describes the use of satellite tracking software and mechanisms in solar tracking applications Ironically there was even a system called sun chaser said to have been a solar positioner system known for chasing the sun throughout the day Using solar equations in an electronic circuit for automatic solar tracking is quite simple even if you are a novice but mathematical solar equations are over complicated by academic experts and professors in text books journal articles and internet websites In terms of solar hobbies scholars students and Hobbyist s looking at solar tracking electronics or PC programs for solar tracking are usually overcome by the sheer volume of scientific material and internet resources which leaves many developers in frustration when search for simple experimental solar tracking source code for their on axis sun tracking systems This booklet will simplify the search for the mystical sun tracking formulas for your sun tracker innovation and help you develop your own autonomous solar tracking controller By directing the solar collector directly into the sun a solar harvesting means or device can harness sunlight or thermal heat This is achieved with the help of sun angle formulas solar angle formulas or solar tracking procedures for the calculation of sun s position in the sky Automatic sun tracking system software includes algorithms for solar altitude azimuth angle calculations required in following the sun across the sky In using the longitude latitude GPS coordinates of the solar tracker location these sun tracking software tools supports precision solar tracking by determining the solar altitude azimuth coordinates for the sun trajectory in altitude azimuth tracking at the tracker location using certain sun angle formulas in sun vector calculations Instead of follow the sun software

a sun tracking sensor such as a sun sensor or webcam or video camera with vision based sun following image processing software can also be used to determine the position of the sun optically Such optical feedback devices are often used in solar panel tracking systems and dish tracking systems Dynamic sun tracing is also used in solar surveying DNI analyser and sun surveying systems that build solar infographics maps with solar radiance irradiance and DNI models for GIS geographical information system In this way geospatial methods on solar environment interaction makes use use of geospatial technologies GIS Remote Sensing and Cartography Climatic data and weather station or weather center data as well as queries from sky servers and solar resource database systems i e on DB2 Sybase Oracle SQL MySQL may also be associated with solar GIS maps In such solar resource modelling systems a pyranometer or solarimeter is normally used in addition to measure direct and indirect scattered dispersed reflective radiation for a particular geographical location Sunlight analysis is important in flash photography where photographic lighting are important for photographers GIS systems are used by architects who add sun shadow applets to study architectural shading or sun shadow analysis solar flux calculations optical modelling or to perform weather modelling Such systems often employ a computer operated telescope type mechanism with ray tracing program software as a solar navigator or sun tracer that determines the solar position and intensity The purpose of this booklet is to assist developers to track and trace suitable source code and solar tracking algorithms for their application whether a hobbyist scientist technician or engineer Many open source sun following and tracking algorithms and source code for solar tracking programs and modules are freely available to download on the internet today Certain proprietary solar tracker kits and solar tracking controllers include a software development kit SDK for its application programming interface API attributes Pebble Widget libraries widget toolkits GUI toolkit and UX libraries with graphical control elements are also available to construct the graphical user interface GUI for your solar tracking or solar power monitoring program The solar library used by solar position calculators solar simulation software and solar contour calculators include machine program code for the solar hardware controller which are software programmed into Micro controllers Programmable Logic Controllers PLC programmable gate arrays Arduino processor or PIC processor PC based solar tracking is also high in demand using C Visual Basic VB as well as MS Windows Linux and Apple Mac based operating systems for sun path tables on Matlab Excel Some books and internet webpages use other terms such as sun angle calculator sun position calculator or solar angle calculator As said such software code calculate the solar azimuth angle solar altitude angle solar elevation angle or the solar Zenith angle Zenith solar angle is simply referenced from vertical plane the mirror of the elevation angle measured from the horizontal or ground plane level Similar software code is also used in solar calculator apps or the solar power calculator apps for IOS and Android smartphone devices Most of these smartphone solar mobile apps show the sun path and sun angles for any location and date over a 24 hour period Some smartphones include augmented reality features in which you can physically see and look at the solar path through your cell phone camera or mobile phone camera at your

phone s specific GPS location In the computer programming and digital signal processing DSP environment free open source program code are available for VB Net Delphi Python C C C PHP Swift ADM F Flash Basic QBasic GBasic KBasic SIMPL language Squirrel Solaris Assembly language on operating systems such as MS Windows Apple Mac DOS or Linux OS Software algorithms predicting position of the sun in the sky are commonly available as graphical programming platforms such as Matlab Mathworks Simulink models Java applets TRNSYS simulations Scada system apps Labview module Beckhoff TwinCAT Visual Studio Siemens SPA mobile and iphone apps Android or iOS tablet apps and so forth At the same time PLC software code for a range of sun tracking automation technology can follow the profile of sun in sky for Siemens HP Panasonic ABB Allan Bradley OMRON SEW Festo Beckhoff Rockwell Schneider Endress Hauser Fudji electric Honeywell Fuchs Yokonawa or Muthibishi platforms Sun path projection software are also available for a range of modular IPC embedded PC motherboards Industrial PC PLC Programmable Logic Controller and PAC Programmable Automation Controller such as the Siemens S7 1200 or Siemens Logo Beckhoff IPC or CX series OMRON PLC Ercam PLC AC500plc ABB National Instruments NI PXI or NI cRIO PIC processor Intel 8051 8085 IBM Cell Power Brain or Truenorth series FPGA Xilinx Altera Nios Intel Xeon Atmel megaAVR MPU Maple Teensy MSP XMOS Xbee ARM Raspberry Pi Eagle Arduino or Arduino AtMega microcontroller with servo motor stepper motor direct current DC pulse width modulation PWM current driver or alternating current AC SPS or IPC variable frequency drives VFD motor drives also termed adjustable frequency drive variable speed drive AC drive micro drive or inverter drive for electrical mechatronic pneumatic or hydraulic solar tracking actuators The above motion control and robot control systems include analogue or digital interfacing ports on the processors to allow for tracker angle orientation feedback control through one or a combination of angle sensor or angle encoder shaft encoder precision encoder optical encoder magnetic encoder direction encoder rotational encoder chip encoder tilt sensor inclination sensor or pitch sensor Note that the tracker s elevation or zenith axis angle may measured using an altitude angle declination angle inclination angle pitch angle or vertical angle zenith angle sensor or inclinometer Similarly the tracker s azimuth axis angle be measured with a azimuth angle horizontal angle or roll angle sensor Chip integrated accelerometer magnetometer gyroscope type angle sensors can also be used to calculate displacement Other options include the use of thermal imaging systems such as a Fluke thermal imager or robotic or vision based solar tracker systems that employ face tracking head tracking hand tracking eye tracking and car tracking principles in solar tracking With unattended decentralised rural island isolated or autonomous off grid power installations remote control monitoring data acquisition digital datalogging and online measurement and verification equipment becomes crucial It assists the operator with supervisory control to monitor the efficiency of remote renewable energy resources and systems and provide valuable web based feedback in terms of CO_2 and clean development mechanism CDM reporting A power quality analyser for diagnostics through internet WiFi and cellular mobile links is most valuable in frontline troubleshooting and predictive

maintenance where quick diagnostic analysis is required to detect and prevent power quality issues Solar tracker applications cover a wide spectrum of solar applications and solar assisted application including concentrated solar power generation solar desalination solar water purification solar steam generation solar electricity generation solar industrial process heat solar thermal heat storage solar food dryers solar water pumping hydrogen production from methane or producing hydrogen and oxygen from water HHO through electrolysis Many patented or non patented solar apparatus include tracking in solar apparatus for solar electric generator solar desalinator solar steam engine solar ice maker solar water purifier solar cooling solar refrigeration USB solar charger solar phone charging portable solar charging tracker solar coffee brewing solar cooking or solar dying means Your project may be the next breakthrough or patent but your invention is held back by frustration in search for the sun tracker you require for your solar powered appliance solar generator solar tracker robot solar freezer solar cooker solar drier solar pump solar freezer or solar dryer project Whether your solar electronic circuit diagram include a simplified solar controller design in a solar electricity project solar power kit solar hobby kit solar steam generator solar hot water system solar ice maker solar desalinator hobbyist solar panels hobby robot or if you are developing professional or hobby electronics for a solar utility or micro scale solar powerplant for your own solar farm or solar farming this publication may help accelerate the development of your solar tracking innovation Lately solar polygeneration solar trigeneration solar triple generation and solar quad generation adding delivery of steam liquid gaseous fuel or capture food grade CO_2 systems have need for automatic solar tracking These systems are known for significant efficiency increases in energy yield as a result of the integration and re use of waste or residual heat and are suitable for compact packaged micro solar powerplants that could be manufactured and transported in kit form and operate on a plug and play basis Typical hybrid solar power systems include compact or packaged solar micro combined heat and power CHP or mCHP or solar micro combined cooling heating and power CCHP CHPC mCCHP or mCHPC systems used in distributed power generation These systems are often combined in concentrated solar CSP and CPV smart microgrid configurations for off grid rural island or isolated microgrid minigrid and distributed power renewable energy systems Solar tracking algorithms are also used in modelling of trigeneration systems using Matlab Simulink Modelica or TRNSYS platform as well as in automation and control of renewable energy systems through intelligent parsing multi objective adaptive learning control and control optimization strategies Solar tracking algorithms also find application in developing solar models for country or location specific solar studies for example in terms of measuring or analysis of the fluctuations of the solar radiation i e direct and diffuse radiation in a particular area Solar DNI solar irradiance and atmospheric information and models can thus be integrated into a solar map solar atlas or geographical information systems GIS Such models allows for defining local parameters for specific regions that may be valuable in terms of the evaluation of different solar in photovoltaic of CSP systems on simulation and synthesis platforms such as Matlab and Simulink or in linear or multi objective

optimization algorithm platforms such as COMPOSE EnergyPLAN or DER CAM A dual axis solar tracker and single axis solar tracker may use a sun tracker program or sun tracker algorithm to position a solar dish solar panel array heliostat array PV panel solar antenna or infrared solar nantenna A self tracking solar concentrator performs automatic solar tracking by computing the solar vector Solar position algorithms TwinCAT SPA or PSA Algorithms use an astronomical algorithm to calculate the position of the sun It uses astronomical software algorithms and equations for solar tracking in the calculation of sun s position in the sky for each location on the earth at any time of day Like an optical solar telescope the solar position algorithm pin points the solar reflector at the sun and locks onto the sun s position to track the sun across the sky as the sun progresses throughout the day Optical sensors such as photodiodes light dependant resistors LDR or photoresistors are used as optical accuracy feedback devices Lately we also included a section in the book with links to microprocessor code on how the PixArt Wii infrared camera in the Wii remote or Wiimote may be used in infrared solar tracking applications In order to harvest free energy from the sun some automatic solar positioning systems use an optical means to direct the solar tracking device These solar tracking strategies use optical tracking techniques such as a sun sensor means to direct sun rays onto a silicon or CMOS substrate to determine the X and Y coordinates of the sun s position In a solar mems sun sensor device incident sunlight enters the sun sensor through a small pin hole in a mask plate where light is exposed to a silicon substrate In a web camera or camera image processing sun tracking and sun following means object tracking software performs multi object tracking or moving object tracking methods In an solar object tracking technique image processing software performs mathematical processing to box the outline of the apparent solar disc or sun blob within the captured image frame while sun localization is performed with an edge detection algorithm to determine the solar vector coordinates An automated positioning system help maximize the yields of solar power plants through solar tracking control to harness sun s energy In such renewable energy systems the solar panel positioning system uses a sun tracking techniques and a solar angle calculator in positioning PV panels in photovoltaic systems and concentrated photovoltaic CPV systems Automatic on axis solar tracking in a PV solar tracking system can be dual axis sun tracking or single axis sun solar tracking It is known that a motorized positioning system in a photovoltaic panel tracker increase energy yield and ensures increased power output even in a single axis solar tracking configuration Other applications such as robotic solar tracker or robotic solar tracking system uses robotica with artificial intelligence in the control optimization of energy yield in solar harvesting through a robotic tracking system Automatic positioning systems in solar tracking designs are also used in other free energy generators such as concentrated solar thermal power CSP and dish Stirling systems The sun tracking device in a solar collector in a solar concentrator or solar collector Such a performs on axis solar tracking a dual axis solar tracker assists to harness energy from the sun through an optical solar collector which can be a parabolic mirror parabolic reflector Fresnel lens or mirror array matrix A parabolic dish or reflector is dynamically steered using a transmission system or solar tracking slew drive mean In

steering the dish to face the sun the power dish actuator and actuation means in a parabolic dish system optically focusses the sun s energy on the focal point of a parabolic dish or solar concentrating means A Stirling engine solar heat pipe thermosyphin solar phase change material PCM receiver or a fibre optic sunlight receiver means is located at the focal point of the solar concentrator The dish Stirling engine configuration is referred to as a dish Stirling system or Stirling power generation system Hybrid solar power systems used in combination with biogas biofuel petrol ethanol diesel natural gas or PNG use a combination of power sources to harness and store solar energy in a storage medium Any multitude of energy sources can be combined through the use of controllers and the energy stored in batteries phase change material thermal heat storage and in cogeneration form converted to the required power using thermodynamic cycles organic Rankin Brayton cycle micro turbine Stirling with an inverter and charge controller **Practical Solar Tracking Automatic Solar Tracking Sun Tracking Автоматическое удержание Солнечная слежения BC 太阳能自动跟踪系统** Gerro Prinsloo,Robert Dobson,2015-11-01 This book details Practical Solar Energy Harvesting Automatic Solar Tracking Sun Tracking Systems Solar Trackers and Sun Tracker Systems using motorized automatic positioning concepts and control principles An intelligent automatic solar tracker is a device that orients a payload toward the sun Such programmable computer based solar tracking device includes principles of solar tracking solar tracking systems as well as microcontroller microprocessor and or PC based solar tracking control to orientate solar reflectors solar lenses photovoltaic panels or other optical configurations towards the sun Motorized space frames and kinematic systems ensure motion dynamics and employ drive technology and gearing principles to steer optical configurations such as mangin parabolic conic or cassegrain solar energy collectors to face the sun and follow the sun movement contour continuously In general the book may benefit solar research and solar energy applications in countries such as Africa Mediterranean Italy Spain Greece USA Mexico South America Brazilia Argentina Chili India Malaysia Middle East UAE Russia Japan and China This book on practical automatic Solar Tracking Sun Tracking is in PDF format and can easily be converted to the EPUB MOBI AZW ePub FB2 LIT LRF MOBI PDB PDF TCR formats for smartphones and Kindle by using the ebook online convert com facility The content of the book is also applicable to communication antenna satellite tracking and moon tracking algorithm source code for which links to free download links are provided In harnessing power from the sun through a solar tracker or practical solar tracking system renewable energy control automation systems require automatic solar tracking software and solar position algorithms to accomplish dynamic motion control with control automation architecture circuit boards and hardware On axis sun tracking system such as the altitude azimuth dual axis or multi axis solar tracker systems use a sun tracking algorithm or ray tracing sensors or software to ensure the sun s passage through the sky is traced with high precision in automated solar tracker applications right through summer solstice solar equinox and winter solstice A high precision sun position calculator or sun position algorithm is this an important step in the design and construction of an automatic solar tracking system From sun

tracing software perspective the sonnet Tracing The Sun has a literal meaning Within the context of sun track and trace this book explains that the sun s daily path across the sky is directed by relatively simple principles and if grasped understood then it is relatively easy to trace the sun with sun following software Sun position computer software for tracing the sun are available as open source code sources that is listed in this book Ironically there was even a system called sun chaser said to have been a solar positioner system known for chasing the sun throughout the day Using solar equations in an electronic circuit for automatic solar tracking is quite simple even if you are a novice but mathematical solar equations are over complicated by academic experts and professors in text books journal articles and internet websites In terms of solar hobbies scholars students and Hobbyist s looking at solar tracking electronics or PC programs for solar tracking are usually overcome by the sheer volume of scientific material and internet resources which leaves many developers in frustration when search for simple experimental solar tracking source code for their on axis sun tracking systems This booklet will simplify the search for the mystical sun tracking formulas for your sun tracker innovation and help you develop your own autonomous solar tracking controller By directing the solar collector directly into the sun a solar harvesting means or device can harness sunlight or thermal heat This is achieved with the help of sun angle formulas solar angle formulas or solar tracking procedures for the calculation of sun s position in the sky Automatic sun tracking system software includes algorithms for solar altitude azimuth angle calculations required in following the sun across the sky In using the longitude latitude GPS coordinates of the solar tracker location these sun tracking software tools supports precision solar tracking by determining the solar altitude azimuth coordinates for the sun trajectory in altitude azimuth tracking at the tracker location using certain sun angle formulas in sun vector calculations Instead of follow the sun software a sun tracking sensor such as a sun sensor or webcam or video camera with vision based sun following image processing software can also be used to determine the position of the sun optically Such optical feedback devices are often used in solar panel tracking systems and dish tracking systems Dynamic sun tracing is also used in solar surveying DNI analyser and sun surveying systems that build solar infographics maps with solar radiance irradiance and DNI models for GIS geographical information system In this way geospatial methods on solar environment interaction makes use use of geospatial technologies GIS Remote Sensing and Cartography Climatic data and weather station or weather center data as well as queries from sky servers and solar resource database systems i e on DB2 Sybase Oracle SQL MySQL may also be associated with solar GIS maps In such solar resource modelling systems a pyranometer or solarimeter is normally used in addition to measure direct and indirect scattered dispersed reflective radiation for a particular geographical location Sunlight analysis is important in flash photography where photographic lighting are important for photographers GIS systems are used by architects who add sun shadow applets to study architectural shading or sun shadow analysis solar flux calculations optical modelling or to perform weather modelling Such systems often employ a computer operated telescope type mechanism with ray tracing program software as a solar

navigator or sun tracer that determines the solar position and intensity The purpose of this booklet is to assist developers to track and trace suitable source code and solar tracking algorithms for their application whether a hobbyist scientist technician or engineer Many open source sun following and tracking algorithms and source code for solar tracking programs and modules are freely available to download on the internet today Certain proprietary solar tracker kits and solar tracking controllers include a software development kit SDK for its application programming interface API attributes Pebble Widget libraries widget toolkits GUI toolkit and UX libraries with graphical control elements are also available to construct the graphical user interface GUI for your solar tracking or solar power monitoring program The solar library used by solar position calculators solar simulation software and solar contour calculators include machine program code for the solar hardware controller which are software programmed into Micro controllers Programmable Logic Controllers PLC programmable gate arrays Arduino processor or PIC processor PC based solar tracking is also high in demand using C Visual Basic VB as well as MS Windows Linux and Apple Mac based operating systems for sun path tables on Matlab Excel Some books and internet webpages use other terms such as sun angle calculator sun position calculator or solar angle calculator As said such software code calculate the solar azimuth angle solar altitude angle solar elevation angle or the solar Zenith angle Zenith solar angle is simply referenced from vertical plane the mirror of the elevation angle measured from the horizontal or ground plane level Similar software code is also used in solar calculator apps or the solar power calculator apps for IOS and Android smartphone devices Most of these smartphone solar mobile apps show the sun path and sun angles for any location and date over a 24 hour period Some smartphones include augmented reality features in which you can physically see and look at the solar path through your cell phone camera or mobile phone camera at your phone s specific GPS location In the computer programming and digital signal processing DSP environment free open source program code are available for VB Net Delphi Python C C C PHP Swift ADM F Flash Basic QBasic GBasic KBasic SIMPL language Squirrel Solaris Assembly language on operating systems such as MS Windows Apple Mac DOS or Linux OS Software algorithms predicting position of the sun in the sky are commonly available as graphical programming platforms such as Matlab Mathworks Simulink models Java applets TRNSYS simulations Scada system apps Labview module Beckhoff TwinCAT Visual Studio Siemens SPA mobile and iphone apps Android or iOS tablet apps and so forth At the same time PLC software code for a range of sun tracking automation technology can follow the profile of sun in sky for Siemens HP Panasonic ABB Allan Bradley OMRON SEW Festo Beckhoff Rockwell Schneider Endress Hauser Fudji electric Honeywell Fuchs Yokonawa or Muthibishi platforms Sun path projection software are also available for a range of modular IPC embedded PC motherboards Industrial PC PLC Programmable Logic Controller and PAC Programmable Automation Controller such as the Siemens S7 1200 or Siemens Logo Beckhoff IPC or CX series OMRON PLC Ercam PLC AC500plc ABB National Instruments NI PXI or NI cRIO PIC processor Intel 8051 8085 IBM Cell Power Brain or Truenorth series FPGA Xilinx Altera Nios Intel Xeon Atmel

megaAVR MPU Maple Teensy MSP XMOS Xbee ARM Raspberry Pi Eagle Arduino or Arduino AtMega microcontroller with servo motor stepper motor direct current DC pulse width modulation PWM current driver or alternating current AC SPS or IPC variable frequency drives VFD motor drives also termed adjustable frequency drive variable speed drive AC drive micro drive or inverter drive for electrical mechatronic pneumatic or hydraulic solar tracking actuators The above motion control and robot control systems include analogue or digital interfacing ports on the processors to allow for tracker angle orientation feedback control through one or a combination of angle sensor or angle encoder shaft encoder precision encoder optical encoder magnetic encoder direction encoder rotational encoder chip encoder tilt sensor inclination sensor or pitch sensor Note that the tracker s elevation or zenith axis angle may measured using an altitude angle declination angle inclination angle pitch angle or vertical angle zenith angle sensor or inclinometer Similarly the tracker s azimuth axis angle be measured with a azimuth angle horizontal angle or roll angle sensor Chip integrated accelerometer magnetometer gyroscope type angle sensors can also be used to calculate displacement Other options include the use of thermal imaging systems such as a Fluke thermal imager or robotic or vision based solar tracker systems that employ face tracking head tracking hand tracking eye tracking and car tracking principles in solar tracking With unattended decentralised rural island isolated or autonomous off grid power installations remote control monitoring data acquisition digital datalogging and online measurement and verification equipment becomes crucial It assists the operator with supervisory control to monitor the efficiency of remote renewable energy resources and systems and provide valuable web based feedback in terms of CO_2 and clean development mechanism CDM reporting A power quality analyser for diagnostics through internet WiFi and cellular mobile links is most valuable in frontline troubleshooting and predictive maintenance where quick diagnostic analysis is required to detect and prevent power quality issues Solar tracker applications cover a wide spectrum of solar applications and solar assisted application including concentrated solar power generation solar desalination solar water purification solar steam generation solar electricity generation solar industrial process heat solar thermal heat storage solar food dryers solar water pumping hydrogen production from methane or producing hydrogen and oxygen from water HHO through electrolysis Many patented or non patented solar apparatus include tracking in solar apparatus for solar electric generator solar desalinator solar steam engine solar ice maker solar water purifier solar cooling solar refrigeration USB solar charger solar phone charging portable solar charging tracker solar coffee brewing solar cooking or solar dying means Your project may be the next breakthrough or patent but your invention is held back by frustration in search for the sun tracker you require for your solar powered appliance solar generator solar tracker robot solar freezer solar cooker solar drier solar pump solar freezer or solar dryer project Whether your solar electronic circuit diagram include a simplified solar controller design in a solar electricity project solar power kit solar hobby kit solar steam generator solar hot water system solar ice maker solar desalinator hobbyist solar panels hobby robot or if you are developing professional or hobby electronics for a solar utility or

micro scale solar powerplant for your own solar farm or solar farming this publication may help accelerate the development of your solar tracking innovation Lately solar polygeneration solar trigeneration solar triple generation and solar quad generation adding delivery of steam liquid gaseous fuel or capture food grade CO_2 systems have need for automatic solar tracking These systems are known for significant efficiency increases in energy yield as a result of the integration and re use of waste or residual heat and are suitable for compact packaged micro solar powerplants that could be manufactured and transported in kit form and operate on a plug and play basis Typical hybrid solar power systems include compact or packaged solar micro combined heat and power CHP or mCHP or solar micro combined cooling heating and power CCHP CHPC mCCHP or mCHPC systems used in distributed power generation These systems are often combined in concentrated solar CSP and CPV smart microgrid configurations for off grid rural island or isolated microgrid minigrid and distributed power renewable energy systems Solar tracking algorithms are also used in modelling of trigeneration systems using Matlab Simulink Modelica or TRNSYS platform as well as in automation and control of renewable energy systems through intelligent parsing multi objective adaptive learning control and control optimization strategies Solar tracking algorithms also find application in developing solar models for country or location specific solar studies for example in terms of measuring or analysis of the fluctuations of the solar radiation i e direct and diffuse radiation in a particular area Solar DNI solar irradiance and atmospheric information and models can thus be integrated into a solar map solar atlas or geographical information systems GIS Such models allows for defining local parameters for specific regions that may be valuable in terms of the evaluation of different solar in photovoltaic of CSP systems on simulation and synthesis platforms such as Matlab and Simulink or in linear or multi objective optimization algorithm platforms such as COMPOSE EnergyPLAN or DER CAM A dual axis solar tracker and single axis solar tracker may use a sun tracker program or sun tracker algorithm to position a solar dish solar panel array heliostat array PV panel solar antenna or infrared solar nantenna A self tracking solar concentrator performs automatic solar tracking by computing the solar vector Solar position algorithms TwinCAT SPA or PSA Algorithms use an astronomical algorithm to calculate the position of the sun It uses astronomical software algorithms and equations for solar tracking in the calculation of sun s position in the sky for each location on the earth at any time of day Like an optical solar telescope the solar position algorithm pin points the solar reflector at the sun and locks onto the sun s position to track the sun across the sky as the sun progresses throughout the day Optical sensors such as photodiodes light dependant resistors LDR or photoresistors are used as optical accuracy feedback devices Lately we also included a section in the book with links to microprocessor code on how the PixArt Wii infrared camera in the Wii remote or Wiimote may be used in infrared solar tracking applications In order to harvest free energy from the sun some automatic solar positioning systems use an optical means to direct the solar tracking device These solar tracking strategies use optical tracking techniques such as a sun sensor means to direct sun rays onto a silicon or CMOS substrate to determine the X and Y coordinates of the sun s

position In a solar mems sun sensor device incident sunlight enters the sun sensor through a small pin hole in a mask plate where light is exposed to a silicon substrate In a web camera or camera image processing sun tracking and sun following means object tracking software performs multi object tracking or moving object tracking methods In an solar object tracking technique image processing software performs mathematical processing to box the outline of the apparent solar disc or sun blob within the captured image frame while sun localization is performed with an edge detection algorithm to determine the solar vector coordinates An automated positioning system help maximize the yields of solar power plants through solar tracking control to harness sun s energy In such renewable energy systems the solar panel positioning system uses a sun tracking techniques and a solar angle calculator in positioning PV panels in photovoltaic systems and concentrated photovoltaic CPV systems Automatic on axis solar tracking in a PV solar tracking system can be dual axis sun tracking or single axis sun solar tracking It is known that a motorized positioning system in a photovoltaic panel tracker increase energy yield and ensures increased power output even in a single axis solar tracking configuration Other applications such as robotic solar tracker or robotic solar tracking system uses robotica with artificial intelligence in the control optimization of energy yield in solar harvesting through a robotic tracking system Automatic positioning systems in solar tracking designs are also used in other free energy generators such as concentrated solar thermal power CSP and dish Stirling systems The sun tracking device in a solar collector in a solar concentrator or solar collector Such a performs on axis solar tracking a dual axis solar tracker assists to harness energy from the sun through an optical solar collector which can be a parabolic mirror parabolic reflector Fresnel lens or mirror array matrix A parabolic dish or reflector is dynamically steered using a transmission system or solar tracking slew drive mean In steering the dish to face the sun the power dish actuator and actuation means in a parabolic dish system optically focusses the sun s energy on the focal point of a parabolic dish or solar concentrating means A Stirling engine solar heat pipe thermosyphin solar phase change material PCM receiver or a fibre optic sunlight receiver means is located at the focal point of the solar concentrator The dish Stirling engine configuration is referred to as a dish Stirling system or Stirling power generation system Hybrid solar power systems used in combination with biogas biofuel petrol ethanol diesel natural gas or PNG use a combination of power sources to harness and store solar energy in a storage medium Any multitude of energy sources can be combined through the use of controllers and the energy stored in batteries phase change material thermal heat storage and in cogeneration form converted to the required power using thermodynamic cycles organic Rankin Brayton cycle micro turbine Stirling with an inverter and charge controller Solar Tracking Tracking Systems Solar Tracker Systems Tracker PC   **Sun Tracking and Solar Renewable Energy Harvesting** Gerro Prinsloo,Robert Dobson,2015-11-02 Free to download eBook on Practical Solar Tracking Design Solar Tracking Sun Tracking Sun Tracker Solar Tracker Follow Sun Sun Position calculation Azimuth Elevation Zenith Sun following Sunrise Sunset Moon phase Moonrise Moonset calculators In harnessing power from the sun through a solar

tracker or solar tracking system renewable energy system developers require automatic solar tracking software and solar position algorithms On axis sun tracking system such as the altitude azimuth dual axis or multi axis solar tracker systems use a sun tracking algorithm or ray tracing sensors or software to ensure the sun s passage through the sky is traced with high precision in automated solar tracker applications right through summer solstice solar equinox and winter solstice Eco Friendly and Environmentally Sustainable Micro Combined Solar Heat and Power m CHP m CCHP m CHCP with Microgrid Storage and Layered Smartgrid Control towards Supplying Off Grid Rural Villages in developing BRICS countries such as Africa India China and Brazil Off grid rural villages and isolated islands areas require mCHP and trigeneration solar power plants and associated isolated smart microgrid solutions to serve the community energy needs This article describes the development progress for such a system also referred to as solar polygeneration The system includes a sun tracker mechanism wherin a parabolic dish or lenses are guided by a light sensitive mechanique in a way that the solar receiver is always at right angle to the solar radiation Solar thermal energy is then either converted into electrical energy through a free piston Stirling or stored in a thermal storage container The project includes the thermodynamic modeling of the plant in Matlab Simulink as well as the development of an intelligent control approach that includes smart microgrid distribution and optimization The book includes aspects in the simulation and optimization of stand alone hybrid renewable energy systems and co generation in isolated or islanded microgrids It focusses on the stepwise development of a hybrid solar driven micro combined cooling heating and power mCCHP compact trigeneration polygeneration and thermal energy storage TES system with intelligent weather prediction weak ahead scheduling time horizon and look ahead dispatch on integrated smart microgrid distribution principles The solar harvesting and solar thermodynamic system includes an automatic sun tracking platform based on a PLC controlled mechatronic sun tracking system that follows the sun progressing across the sky An intelligent energy management and adaptive learning control optimization approach is proposed for autonomous off grid remote power applications both for thermodynamic optimization and smart micro grid optimization for distributed energy resources DER The correct resolution of this load following multi objective optimization problem is a complex task because of the high number and multi dimensional variables the cross correlation and interdependency between the energy streams as well as the non linearity in the performance of some of the system components Exergy based control approaches for smartgrid topologies are considered in terms of the intelligence behind the safe and reliable operation of a microgrid in an automated system that can manage energy flow in electrical as well as thermal energy systems The standalone micro grid solution would be suitable for a rural village intelligent building district energy system campus power shopping mall centre isolated network eco estate or remote island application setting where self generation and decentralized energy system concepts play a role Discrete digital simulation models for the thermodynamic and active demand side management systems with digital smartgrid control unit to optimize the system energy management is currently under development Parametric

simulation models for this trigeneration system polygeneration poligeneration quadgeneration are developed on the Matlab Simulink and TrnSys platforms In terms of model predictive coding strategies the automation controller will perform multi objective cost optimization for energy management on a microgrid level by managing the generation and storage of electrical heat and cooling energies in layers Each layer has its own set of smart microgrid priorities associated with user demand side cycle predictions Mixed Integer Linear Programming and Neural network algorithms are being modeled to perform Multi Objective Control optimization as potential optimization and adaptive learning techniques **Architectural Design with SketchUp** Alexander C. Schreyer,2015-10-01 Go beyond the basics making SketchUp work for you Architectural Design with SketchUp Second Edition is the leading guide to this incredibly useful tool for architects interior designers construction professionals and makers With easy to follow tutorials that first brush up on the basics of the program and then cover many advanced processes this resource offers both informative text and full color illustrations to clearly convey the techniques and features you need to excel The updated second edition has a new chapter that explains how to make things with SketchUp and covers 3D printing design to fabrication CNC milling and laser cutting Other chapters also now cover Building Information Modeling BIM and 3D web content generation Additionally the revised text offers insight into the latest products and plugin extensions navigation methods import export options and 3D model creation features to ensure you have an up to date understanding of how to make SketchUp help you meet your project goals A leading 3D modeling application SketchUp features documentation capabilities through photorealistic renderings and construction drawings Because of its ease of use and ability to be enhanced with many plugin extensions for project specific applications SketchUp is considered the tool of choice for professionals in the architecture interior design construction and fabrication fields Access thoroughly updated information in an easy to understand writing style Increase your efficiency and accuracy when using SketchUp and refresh and supplement your understanding of SketchUp s basics Explore component based modeling for assembly scheduling collaborative design and modeling with a BIM approach Find the right plugin extensions and understand how to best work with them See how easy it is to generate presentation ready renderings from your 3D models Learn how you can use 3D printing CNC milling and laser cutting to make things with SketchUp Use cookbook style Ruby coding to create amazing 3D objects Supplement your knowledge with video tutorials sample files and Ruby scripts via a robust companion website Architectural Design with SketchUp Second Edition is an integral resource for both students and professionals working in the architecture interior design construction and fabrication industries SketchUp 2014 For Dummies Aidan Chopra,2014-05-29 Start building your 3D model today with a comprehensive guide to SketchUp 2014 SketchUp 2014 For Dummies is a user friendly guide to creating 3D models adding textures creating animated walkthroughs and more using one of the most popular 3D modeling programs on the market Fully updated to align with the release of SketchUp the book guides you through the interface tools techniques and tricks in SketchUp and SketchUp Pro on both Windows and Mac

platforms Written for designers with no prior 3D modeling experience the book provides beginner to intermediate level instruction in this powerful program With a strong emphasis on usability rather than features SketchUp has found widespread success around the world Available as a free download the program allows you to get comfortable and develop your skills before investing in the Pro version s additional features SketchUp 2014 For Dummies gets you up to speed fast beginning with an overview of the basic concepts of 3D modeling before getting down to business with the software Organized for easy navigation the book can also serve as a handy desk reference for more experienced designers getting acquainted with the latest update Topics include Using SketchUp 2014 to create 3D models Printing on a plotter or 3D printer Sharing designs via SketchUp 3D Warehouse Exporting to another design package The book also walks you through the creation of a detailed set of plans and demonstrates how to give virtual tours of your design A 16 page color insert illustrates the possibilities and may just trigger your inspiration Whether you re a designer architect engineer or hobbyist SketchUp 2014 For Dummies gets you started quickly   SketchUp For Dummies Bill Fane,Mark Harrison,Josh Reilly,2020-07-31 The first step in making your ideas a reality SketchUp offers a vast array of tools that help you get your building woodworking and design plans out of your head and into a real model Even if you ve never dabbled in the software SketchUp All in One For Dummies makes it easy to get started as quickly as the ideas pop into your head Providing real world insight from top SketchUp insiders these six books in one teach you how to tackle the basics of the program and apply those skills to real world projects You ll discover the basics of modeling as they apply to either free or paid versions of SketchUp before diving into creating models to use for making objects constructing buildings or redesigning interiors Navigate the SketchUp product mix Get familiar with the basics of modeling View and share your models Make your architecture interior design and woodworking dreams a reality You have tons of great ideas and now you can harness this powerful software to bring them to life   *Real World Google SketchUp 7* Mike Tadros,2010-04-09 Expert SketchUp instructor Mike Tadros shows you his techniques for using SketchUp in a professional production oriented environment allowing you to finish drawings faster and get better results whether you work alone or in a multiperson studio Starting with customizing SketchUp preferences for maximum efficiency Mike takes you through a professional SketchUp workflow from setting up your workspace to installing Ruby scripts to importing CAD files and images to managing libraries to exporting your finished product In Real World Google SketchUp you ll learn how to Turn your site plans floor plans and elevations into 3D SketchUp models Import your own digital photos and hand drawn imagery into SketchUp Create animated fly throroughs by saving scenes and exporting movie files Use Google Earth to create site models and utilize the Google 3D Warehouse to add elements to your models Get more out of SketchUp with bonus video tutorials on the included DVD All of Peachpit s eBooks contain the same content as the print edition You will find a link in the last few pages of your eBook that directs you to the media files Helpful tips If you are able to search the book search for Where are the lesson files Go to the very last page

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learn how to transform 2D images into 3D printable solids how to create multi part prints that can be assembled without the use of fasteners or glue and how to make sure your model whether designed from scratch or assembled from preexisting geometry is ready to be made real via your 3D printer By the end of this book you ll have the confidence to bring your design ideas to life by generating your own 3D print ready models with SketchUp What you will learnUnderstand SketchUp s role in the 3D printing workflowGenerate print ready geometry using SketchUpImport existing files for editing in SketchUpVerify whether a model is ready to be printed or notModel from a reference object and use native editing toolsExplore the options available for adding onto SketchUp for the purpose of 3D printing extensions Understand the steps to export a file from SketchUpWho this book is for If you own or have access to a 3D printer and are tired of downloading and printing other people s 3D models this book is for you Learn how to use SketchUp to create your own custom pieces or modify existing files so you can print exactly what you need Whether you are an architect hoping to print buildings a designer needing quick physical prototypes or a hobbyist wanting to print a tchotchke this book is for you Readers should have completed some training in fundamentals in SketchUp and be able to create and edit basic geometry   SketchUp for Builders John G. Brock,2018-12-05 The only comprehensive SketchUp guide written for builders and contractors SketchUp is a 3D modeling application used in areas ranging from civil and mechanical engineering to motion picture and video game design Three dimensional modeling is of obvious value to the building industry yet resources for transforming architectural designs into reality is surprisingly limited SketchUp for Builders is the first comprehensive guide designed specifically for builders and contractors providing step by step instructions on incorporating 3D modeling into all phases of the construction process Author John Brock draws from his 30 years of experience as a custom home designer and builder to provide practical advice on how to understand what you are building before it is built This valuable guide demonstrates how to eliminate cost overruns construction delays and design flaws by integrating SketchUp modeling into your workflow Emphasizing real world practicality this book covers all of the essential components of modeling a 3D construction project from SketchUp fundamentals and object basics to importing construction drawings and increasing project efficiency with extensions and plugins All phases of construction are clearly explained including foundations walls and floor systems roof and mechanical systems and exterior and interior finishes Supplies a constructability process for efficient and cost effective build projects Offers step by step guidance for creating construction documents renderings animations virtual reality tours and more Integrates SketchUp into all stages of the construction process Provides access to resources such as web tutorials blogs and the online SketchUp community Demonstrates how to generate construction documents with accompanying Layout software SketchUp for Builders A Comprehensive Guide for Creating 3D Building Models Using SketchUp in an indispensable source of information for contractors and builders architects interior designers landscape architects construction professionals and anyone seeking to create 3D models of the design and construction process   Rendering in SketchUp Daniel

Tal,2013-03-25 The sure way for design professionals to learn SketchUp modeling and rendering techniques Rendering In SketchUp provides instructions for creating 3D photoreal graphics for SketchUp models using integrated rendering programs The book serves as a beginner rendering manual and reference guide to further develop rendering skills With an emphasis on step by step process SketchUp users learn a universal approach to rendering varied SketchUp projects including architecture interiors and site design models The book focuses on tasks and principles at the core of photorealistic rendering including Rendering process Learn a step by step process focused on workflow within SketchUp s familiar workspace Universal method Understand how the process can be used to work with a variety of different integrated rendering programs including Shaderlight SU Podium and Twilight Render These programs are easy to learn and function in SketchUp Textures and materials Discover how to obtain apply and edit texture images representing surfaces Component details Learn how to acquire and organize model details to allow for rich expressive settings while maintaining computer and SketchUp performance Exterior and simulated lighting Learn to set exterior lighting with the SketchUp s Shadow menu or illuminate a scene with simulated lights lamps and bulbs Render settings Use specific settings for various rendering programs to quickly set texture character image quality and graphic output Computer specifications Find out how computers produce renders and the type of computer hardware required to streamline the process Photoshop post processing Learn how to further refine rendered images in Photoshop Free online chapters The book reviews specific settings for SketchUp and the rendering plug in Shaderlight Given the ever changing nature of technology free online accompanying chapters detail settings for additional integrated rendering programs including SU Podium Twilight Render and more **How to Create 3D Models with SketchUp: SketchUp Tools and Guide for Dummies** Sartalamacchia CORTNEY,2021-06-02 No matter what your skill level is we have sketchup tutorials for you Our growing library of tutorials take you step by step through different topics to help you really comprehend what you want to learn We make every attempt to make sure that you can learn sketchup in a format that fits you best so we use both written and video tutorials What are you waiting for Check them out SketchUp EXERCISES Sachidanand Jha,2019-06 SketchUp EXERCISESDo you want to learn how to design 2D and 3D models in your favorite Computer Aided Design CAD software such as SketchUp FUSION 360 or SolidWorks Look no further We have designed 200 3D CAD exercises that will help you to test your CAD skills What s included in the SketchUp EXERCISES book Whether you are a beginner intermediate or an expert these 3D CAD exercises will challenge you The book contains 200 3D models and practice drawings or exercises Each exercise contains images of the final design and exact measurements needed to create the design Each exercise can be designed on any CAD software which you desire It can be done with AutoCAD SolidWorks Inventor DraftSight Creo Solid Edge Catia NX and other feature based CAD modeling software It is intended to provide Drafters Designers and Engineers with enough 3D CAD exercises for practice on SketchUp It includes almost all types of exercises that are necessary to provide clear concise and systematic information required on

industrial machine part drawings Third Angle Projection is intentionally used to familiarize Drafters Designers and Engineers in Third Angle Projection to meet the expectation of worldwide Engineering drawing print This book is for Beginner Intermediate and Advance CAD users Clear and well drafted drawing help easy understanding of the design These exercises are from Basics to Advance level Each exercises can be assigned and designed separately No Exercise is a prerequisite for another All dimensions are in mm PrerequisiteTo design develop models you should have knowledge of SketchUp Student should have knowledge of Orthographic views and projections Student should have basic knowledge of engineering drawings

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Web site you ll also find a bonus chapter and videos demonstrating more about what you can do with Google SketchUp Google SketchUp 7 For Dummies also shows you what SketchUp can and can t do and offers tips for solving common problems Add a new dimension to your work today **Introduction to Google SketchUp** Aidan Chopra,2012-02-21 Considerably easier to use than other 3D software Google SketchUp has found a niche in architecture landscape design real estate development furniture building and other design professions This book provides an accessible approach that assumes no previous 3D modeling experience and explains the basic concepts involved in 3D modeling Introduction to SketchUp shows readers how to build a 3D model print it share it export it to another professional design package export it to Google Earth and create a 3D animated tour It also helps readers harness the power of Google SketchUp so that they can populate Google Earth with 3D buildings monuments and other sculptures This edition is updated with the latest version of Google SketchUp software easy to read and practical this text not only helps you learn how to use Google SketchUp at your own pace it helps you master the core competencies and skills you need to succeed Developed with architects interior designers landscapers and other design gurus in mind Google SketchUp is the fast easy way to build 3D models of anything you wants buildings furniture landscapes or your own unique creations **SketchUp 8 for Interior Designers** Daniel John Stine,2013-02-18 SketchUp is an all purpose 3D modeling tool The program is primarily developed around architectural design but it can be used to model just about anything It is an easy way to quickly communicate your design ideas to clients or prospective employers Not only can you create great still images SketchUp also is able to produce walk through videos This book has been written with the assumption that you have no prior experience using Trimble SketchUp With this book you will be able to describe and apply many of the fundamental principles needed to develop compelling SketchUp models The book uses a series of tutorial style exercises in order to introduce you to SketchUp Several pieces of furniture are modeled throughout the book The process is broken down into the fundamental concepts of 2D line work 3D extraction applying materials and printing Although the book is primarily written with a classroom setting in mind most individuals will be able to work through it on their own and benefit from the tips and tricks presented For a little inspiration this book has several real world SketchUp project images throughout

Automatic Sketchup Creating 3 D Models In Ruby Book Review: Unveiling the Magic of Language

In an electronic digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**Automatic Sketchup Creating 3 D Models In Ruby**," published by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we shall delve into the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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Automatic Sketchup Creating 3 D Models In Ruby Introduction

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