RAVI CHIKKIREDDY

SKILLS

- Control systems design
- MATLAB/SIMULINK, GIT, Saber RD
- Code Generation, S-function
- MIL, SIL simulations, Requirements
- Plant model design and simulations
- Power converters, drives
- Sensor fusion
- State Estimations
- Microsoft Office

CERTIFICATIONS

- "Predictive Modelling and Machine Learning with MATLAB" in Coursera
- "Deep Learning Onramp" in MathWorks

CONTACT

PHONE:
9948177130
LINKEDIN:
www.linkedin.com/in/ravi-chikkireddy-466b026b
EMAIL:
Chikku.ravi181@gmail.com

SUMMARY

Master's Degree in Power Electronics and Drives. 7 years experience in Control system design. Power converters and drive applications, system identification, stability analysis, plant model and legacy code, Model-based design, code-gen. Reference frame transformations, Sensor fusion of IMU with Encoder and other data, and State estimations. MATLAB/ Simulink, Simscape, Stateflow, Code generation, S-function, Saber RD (MAST Language). Machine Learning for classification and regression learning in MATLAB.

WORK EXPERIENCE

Assistant Lead Engineer
Senvion India, Bangalore
DECEMBER 2022-PRESENT

Electric Drive Train Models:

- Designing of Electrical system model which would work for different power ratings of the turbine and different supplier components
- Designing test scenarios to replicate the prototyping at the field including different faults in the system and how to clear the faults.
- Address the field issues to reproduce and find the solutions for the issues.
- Creating and Performing simulation post-processing activities (collecting all plots and exporting them into Video and Microsoft Excel) using MATLAB scripts

Blade Actuator:

- Modelling DC servo drive to act as pitch drive and designing a position control system

Engineer
Automotive Robotics India, Chennai
Client: Caterpillar India, Chennai
JULY 2020-DECEMBER 2022

- Understand the rigid body dynamics and 3D position control. Apply reference frame transformations between different reference frames(body frame, inertial frame, IMU frame, and Earth frame) using the geometry of the vehicle
- Build control subsystems and generate production-ready code for deployment
- Extended Kalman filter design and tuning to estimate the vehicle path accurately. Estimating Position, and orientation using sensor fusion
- Own and maintaining plant model for "longwall shearer control & automation" (Coal mining machine)
- Conducting research activities to improve the control system to steer the machine better
- Designing of PID controller to control the orientation of the machine and the Roll angles of the seam (soil mapping).

- Model In loop and Processor in loop simulations

Engineer
HBL POWER SYSTEMS, HYDERABAD
FEBRUARY 2017-JULY 2020

- Built simulation models for different power converters to compete with IEC standards
- System Identification and deriving approximate transfer function of the plant.
- Tuning PID controller for the desired response
- Field-oriented control and flux weakening controllers are designed.
- Selective harmonic elimination control systems are modelled for Grid-connected inverter and rectifier systems. Where harmonic currents are extracted using a notch filter and those harmonic currents are regulated to zero using PI controllers. SOGI-based locked loop is designed for accurate synchronization of the inverter with the grid.
- Discrete filters (Low-pass, band pass, notch) designed for sensed signals
- Code Generation using Embedded coder
- Prototyping and testing activities on the prototype.
- Comparing the results with the model results for validation
- Grid Tie Inverter modelling in Saber RD. The controller is modelled using the MAST language. Device modelling for switches, and inductors using available data sheet graphs.
- Saber RD co-simulation with the MATLAB using FMU.

- **Projects handled:**
1. 6-phase motor drive modelling for PMSM
2. 3-phase grid tie solar inverter
3. EV charger (3-phase front-end active rectifier and DC-DC converter)
4. SOC estimation (BMS) using Extended Kalman filter
5. Sensorless speed control of BLDC motor

Internship
HBL POWER SYSTEMS, HYDERABAD
DECEMBER 2015-SEPTEMBER 2016

- Design and Modelling of 3-phase Grid tie solar inverter in Saber RD
- Designed a control system to export solar power to the grid while extracting maximum power from the grid
- Documenting the algorithm and implementing the code in Code Composer Studio manually.

EDUCATION

M.TECH: POWER ELECTRONICS AND DRIVES
GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING, VIZAG
NOV 2014-DEC 2016

B.TECH: ELECTRICAL AND ELECTRONICS ENGINEERING
PRAGATI ENGINEERING COLLEGE, PEDDAPURAM
JULY 2010-MAY 2013

DIPLOMA: ELECTRICAL AND ELECTRONICS ENGINEERING
ANDHRA POLYTECHNIC, KAKINADA

ACCOMPLISHMENTS

- **System model for Wind turbine**: Built the system model using legacy data. Built numerous m-scripts to automate the test scenarios of the turbine and post-processing activities (Scripts to export the results images to video and Excel file). Integrated different subsystems into the system model for system integration.
- **DC servo drive**: Built simulation model for the drive and designed position control system for DC servo drive to control the pitch angle of the blade
- **Plant Model for Longwall shearer**: Shearer is a machine that cuts the coal underground. Had transition activities for 15 years of modelling work. The model can simulate the coal-cutting process in 3 dimensions and simulate the floor profile and pan movement underneath the shearer. **Contribution**: Transformation of IMU reference frame, encoder data, and drum reference frames into body frame and then to inertial frame using vehicle geometry features. As part of LN3, built a PID-based control (including the supporting subsystems) system in an inertial reference frame to control the roll angles of the seam (FAT). Accurate control of FAT angle is achieved using PID controller which improved the coal output. Simulation tests and analysis were carried out to understand the long-term issues of FAT (Face Along Tilt) angle control. Transforming the controlled output(inertial frame) into the body ref frame and then to the drum reference frame to actuate the drum(drum cuts the coal). Extensive behaviour logic was modelled to bring the geometric dimensions into a linear scape to be able to apply the PI controller.
- **Extended Kalman filter development**: Designed EKF to estimate the position and orientation of the shearer. Tuned the KF model with the experimental data obtained from the test vehicle.
- **PMSM drive circuit for EV:** The field-oriented control system is designed to regulate the speed of the motor and to meet the load torque requirements. The transfer function is obtained using a system identification approach in MATLAB and stability analyses using bode plots.
- **Grid Tie Inverter (GTI)**: SOGI-based PLL is designed for synchronization. D-q-based current control is modelled to control the current. LCL filter is designed and verified through simulation. PID-based Selective Harmonic Elimination algorithm is designed for 5th and 7th harmonic currents. Prototype testing for results verification.
- **Solar-powered BLDC drive**: Sensor-less speed control algorithm (FOC) is modelled to control the speed of the motor while extracting maximum power from solar panels. The speed estimation algorithm is designed using the Kalman filter approach. System identification and code generation. Tested the prototype to verify the results.
- **Battery Management system (BMS)**: Extended Kalman filter (EKF) is modelled for the state of charge estimation of the battery

INTERESTS

- Playing Table tennis, cricket and foosball