Avinash Raj DGSK
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EDUCATION:

Arizona State University, Ira. A. Fulton School of Engineering, USA **December 2022**
Master of Science in Mechanical and Aerospace Engineering - CGPA - 3.6

SKILLS:

Concepts: Vehicle Dynamics, CAD, CAE, Design Optimization, CFD, 3D Printing- Micro & Nano Mechanics.

Tools: SolidWorks, Ansys, Abaqus, Catia, Fusion 360, MATLAB, COMSOL, JMP Pro, Simulink, Python.

PROJECTS:

Electrically Assisted 3D Printing of Bioinspired Structures

- Vat Polymerization technique is used to print bioinspired hydrophobic structures based on Salvina Molesta. Smallest part of the printed structures ranges from 25 – 50 µm. COMSOL is used for simulations.
- MWCNT is electrically aligned for Controllable Roughness and for Hydrophobicity Enhancement.

Optimization of Steerability using Design and Analysis of Experiments

- Oversteer and Understeer are important factors in steerability of a Formula 1 car.
- Simulations are made using different factors and several experiments are made using 2K factorial model, Analysis of Variance. Desired response of the car is observed after statistically analyzing the data on JMP Pro 16.

Optimization of Dynamic Model of Rocket Landing Scenario

- A rocket landing scenario is optimized using Python Neural Network.
- Several factors like speed, altitude, energy is optimized together using libraries like numpy, pytorch.

Design Optimization of a Brake Pad

- A brake pad design is optimized for stresses and temperatures using Design of Experiments Techniques in Ansys.
- Static Structural, Modal and Transient Analysis are simulated, and Response surface and Optimization plots are observed using Latin Hypercube Sampling Method to optimize the shape and design of the brake pad.

Failure Analysis Simulation of an iPhone drop test

- iPhone is dropped with and without a protective case from a height of 5ft to observe the stress concentrations and the failure points on the designed model.
- ABAQUS software is used for the dynamic analysis of this drop test. Brittle cracking and shear are observed.

Computational Fluid Dynamics Simulations using Ansys Fluent

- External flow - 3D turbulent model of a building inside a virtual wind tunnel to find the drag.
- Aerodynamics of a 3D Flying Saucer in a cylindrical virtual tunnel – 3D Transient simulation.
- Simulation of natural gas leaking from an underground vault, impact of water droplet on a flat surface and engine oil droplet on an inclined surface – 2D Transient simulation

Finite Element Design to analyze the temperature and heat flux of a copper plate using MATLAB

- A copper plate design is analyzed using the convergence testing methods using mesh generation, forming governing equations from finite element program in MATLAB.
- ABAQUS simulations are compared with the results obtained from MATLAB to compare the errors after testing.

Study of Ductile to Brittle Transition temperature of Mild Steel

- At cryogenic temperatures a material changes its structural properties from ductile to brittle.
- The transition of mild steel is observed using control experiments at these temperatures and then tested with impact methods of testing.

EXPERIENCE:

Research Aide – Lab of Manufacturing Innovations, ASU

- Worked on Thesis for Prof. Xiangjia Li on Electrically Assisted Vat Polymerization Technique.

Vehicle Dynamics and Design Intern, FMAE India

- Designed and developed an electric vehicle sub systems like Transmission, braking, steering and mainly the design using multiple simulations on ANSYS for reliability. CAD modeling is made using SOLIDWORKS software.

HVAC Engineering Intern, Reliance Power

- Worked as an Intern to design effective HVAC systems using Ansys and trained on Industrial Safety Procedures.

Teaching Assistant, ASU – MAE 384; MEE 340

- Worked as a Teaching Assistant for Advanced Mathematics for Engineers and Heat Transfer courses.