Wind measurement using Radar Principle

Guide   : Sibi Raj Pillai

Co-Guide: Sneha Chandwani

Team Size: Maximum of 2 students

Abstract: You will be given Data samples received from an actual MST radar which were further used for the measurement of wind velocities in that region. Using any tools available to you, you need to figure out what these velocities are. The team (or individual) which comes up with more than 90% correct answers wins.

For a better understanding on this topic, one can read the file Indian MST Radar Description.

(Note that one need not understand the entire system functioning to be able to measure the wind velocities for this competition.)

Find sample_data.r1 which stores the sample raw data-time series of observations from a radar. The data is stored in a format as can be seen in the file attached below MST data format. One has to look at the 'New MST and LAWP Header Variables' section. Note that there are 6 beams for storing data from 6 different directions to form a resultant wind velocity vector. You have to show us the plot of wind velocities versus height of only the first beam. The plot of the sample data is as shown sampledata_plot.jpg.

Register: If you seems interested, register with us by clicking on REGISTER button. For any other queries, send us an email at aavriti2017@gmail.com

Python Optimization Problem

Guide   : Madhu N. Belur

Abstract: Many operations research problems, for example mixed integer linear programming, can be solved using Pyomo. There will be a coding test to check acquaintance with Pyomo/Python/Numpy. Further details will be announced and will also be available here by 19 February.

For now, you can start with Pyomo/Python/Numpy tutorials.

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Weighted Paper weighted challenge

Guide   : Siddharth Tallur

Team Size: Maximum of two students

Abstract: The challenge is to build a paper tower using only the raw materials listed below, and score highest number of points on the given metric. The paper tower must be free standing on the floor i.e. not supported by any thing other than the raw materials listed below. The finished tower must support Rs. 1 coins placed on the structure.

The tower must be able to stand without collapsing, supporting its own weight and the weight of the Rs. 1 coins, for at least 30 seconds. Teams will have 30 minutes to construct the tower from the raw materials at the competition.

They are more than welcome to practice and finalize their design using their own resources at home, in advance of the competition.

Raw materials   : 2 sheets of A4 paper, 1ft (12 inches) of tape, 2 pins, Rs. 1 coins to place on top of structure. The tape cannot be used to stick any part of the tower to an external support.

Scoring Metric:

a) 1 point per inch of tower height (measured from base to top of paper structure, not including coins.)

b) 10 extra points if tower is taller than 3ft

c) 3 points per Rs. 1 coin placed on structure (maximum 10 coins, minimum 2 coins)

d) Teams are disqualified if tower collapses within 30 seconds during judging

Time limit to complete building the tower: 30 minutes

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