Colloquio A

Domanda 1

Leggere ad alta voce e tradurre il seguente brano

In a dynamic simulator, it is crucial to faithfully reproduce the driving feelings so that the driver can fully exploit the virtual driving experience. To this aim, the motion cueing (MC) strategy, i.e. the algorithm used to transform vehicle accelerations into admissible motion commands to the platform, has a key role. One of the main difficulties in the design of efficient motion cueing algorithms is given by the complex nature of the human perception system, since from a physiological point of view the role and priorities of stimuli of different nature to the overall perception of accelerations is not yet well known.

In most dynamic simulators, motion cueing algorithms are based on the so called "classical" approach that basically consists of a sequence of filters combined in order to:

- remove low frequency components of accelerations and velocities obtained from the vehicle dynamic model;
- transfer part of the low frequency translational accelerations to the angular dynamic using a low pass filter (tilt coordination);
- limit the platform motions with a further high pass filter to keep the platform in a neutral position. This is commonly called washout action.

Domanda 2

Con riferimento al software Matlab® della Mathworks® descrivere i passaggi e i comandi necessari per caricare un file di dati in formato testo contenente due colonne (la prima rappresenta il tempo e la seconda una quantità di interesse), realizzare un grafico della quantità di interesse nel tempo, ricavare il valore massimo, minimo e medio della quantità di interesse.

Domanda 3

Con riferimento al software Excel di Microsoft, descrivere i passaggi necessari per graficare la funzione y=sen(alfa) con alfa compreso tra 0 e 360°

Colloquio B

Domanda 1

Leggere ad alta voce e tradurre il seguente brano

VI-CarRealTime is a virtual modeling and simulation environment targeted to a simplified 4 wheels vehicle model. Its functionalities include the ability to assemble the vehicle system by collecting its fundamental subsystems, specifying dynamic maneuver schedules, launching standalone or Matlab-Simulink embedded simulations, post-processing the obtained results.

The environment based on underlying solver consists of:

- Symbolically derived parameterized equations of motion;
- Pacejka tire model;
- Sophisticated, virtual driver model.

Such a complete model+environment (tires, driver) is exportable using C and C++ code generation, for subsequent usage for SIL, HIL or vehicle dynamic simulators on Windows or Linux computer platforms.

An intuitive graphical user-interface supports the model definition, model testing, and results review. The global system architecture is fixed (but modifiable upon request), although the system and subsystem parameters are modifiable, as well as all the property files, which characterize component's behaviour.

Domanda 2

Con riferimento al software Matlab® della Mathworks®, dato un vettore con due colonne, dove la prima rappresenta il tempo e la seconda una quantità di interesse, descrivere i passaggi e i comandi necessari per estrarre la seconda metà del vettore, realizzare un grafico della quantità di interesse nel tempo per la parte di vettore estratta e salvare i dati estratti in un file in formato testo.

Domanda 3

Con riferimento al software Excel di Microsoft, descrivere i passaggi e i comandi necessari per graficare la funzione $y=a*x^2$. Con x compreso tra –5 e 5 e "a" parametro variabile il cui valore può essere cambiato dall'utente.