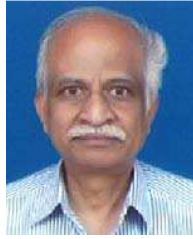


Some Conjectures and Random Thoughts



PA Lakshminarayanan

Acoustics: Arranging microphones in a studio and in a live concert

The sound experts in a recording studio would pick up the sound of instruments by placing the microphones close to the instruments, later moderate the strength and frequency of the composition of sound from each instrument differently and blend them for a pleasant experience of the listeners. In a concert, however, the sound engineer may just amplify the total sound as would be experienced by a listener at a reasonable distance. Hence, the microphones will be kept not near the instruments or the performer but at a distance, usually above the players' heads so that the sounds are picked up for the nearly true experience. However, in most of the Indian concerts sounds from all the instruments are given weights with either equal or distorted. The experience is not pleasant, especially if the amplified sound from percussion instruments overwhelms others.

History of Science and Economic Politics

The conventional thinking is that with the colonizing by the British some three centuries back, Indian economy saw a downtrend and it is still struggling to regain its premiere position. Politics and economics are closely related in any country and for a large country –emotionally or politically integrated as a unit- science and engineering importantly dictate the economics of the country. After repeated external invasions, the repressive rulers from 1000 CE who had no respect for the existing or new knowledge that was dawning elsewhere punished the quest for knowledge. This was the time when Galileo, Newton, Hughes and other great scientists were using new methods of enquiry and founded new knowledge. Under tremendous pressure, the Indian scientific community was already cracking and the fabric of the society was tearing into smithereens, leave alone any opportunity to learn the new developments in the world. It took very little effort for the British to have a cakewalk and the people already under strain invited them with open arms and the rest is history. Thus, the persecution of knowledge seekers over centuries demoralized them and they entered a shell and lost out in obtaining or creating new knowledge.

Galaxies, stars and planets

The observable universe exploded from nothing in a small time and then expanded slowly when the dark matter appeared to limit the rate of expansion. While expanding, it created knots connected by ribbons as it would happen if a ball of dough is pulled in all directions; the dough would tear into fibres with vast amount of empty space in between. These ribbons constitute of

galaxies which are essentially two dimensional discs with mostly even number of tails from their centres where black holes exist. The angular velocity of the outer most part of the tail rotating about the axis of the disc is less than that of the inner parts and the tails form the shape of a volute. The tails contain and stars and planetary systems or dust systems which are proto planets. The planetary or dust systems and the stars are mostly in a plane with very little change in the azimuth of the orbits. This is the result of conservation of angular momentum of the original star from which two (most probably even number of) dust streams burst out; the angular velocity of the revolving streams is slow at the extreme periphery relative to those inside. Also the density at the extreme was light as the lighter components of the dust storm would travel farther from the star against the star's gravitational force. At any radius, the two limbs would revolve at nearly equal angular velocity; the slight inequality would drive them to collision over a period of time and this could cause satellites for the condensing dusts or proto-planets and displace the planets to elliptical orbits.

Poisson, bias cut and draping a sari

Poisson's ratio is the proportional rate at which strain will be generated in the direction perpendicular to that in which the stress is applied. The result is to limit the change in volume of the material because of the applied stress. The induced strain is opposite in sign to the applied strain. In a homogeneous material, for example, a steel bar, the ratio is also homogeneous in all directions. However, when you consider of sheet of material too thin to model it as homogeneous or having fibres aligned in specific directions the ratio is dependent on the direction. Take for example, a conventional woven cloth, where there is a waft and a warp in perpendicular directions (x and y). At an angle of 45° to the x axis, the ratio drops. In such a case, the material behaves differently to stresses in different directions. This is exploited in bias cut of fabrics. Here, the stress is by the weight of the fabric itself. If the waft is along the direction of gravity, the fabric is relatively stiff in the direction perpendicular to the surface; when the waft is at 45° to the direction of the gravity the surface becomes highly flexible. This results in the fabric clinging to the body of the wearer. In India, uncut clothes like saris are worn at 45° at the back and on the front from time immemorial to bring out the features of the wearer, gracefully.