DI Physics Hons.

Paper-I

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Limiting values of σ:

As we have seen,

$$3K(1-2\sigma) = 2n(1+\sigma),$$

where K and n are essentially positive quantities. Therefore,

(i) if Poisson's ratio is a positive quantity, then both right hand side and left hand side of above equation must be positive. This is possible, when

$$1-2\sigma > 0 \text{ or, } \sigma < \frac{1}{2} \text{ or } 0.5.$$

(ii) If σ is a negative quantity, the left hand side expression of the above equation will be positive. Then the right hand side expression must also be positive. Hence

$$1+\sigma > 0 \quad \text{or, } \sigma > -1$$

Thus, the theoretical limiting values of σ are -1 and 0.5, i.e.,

$$-1 < \sigma < 0.5$$