Bernoulli's Infinity Argument

Let R be the number of ways of getting a success in a single trial and let S be the number of ways of getting a failure in a single trial, and let T = R + S. Let W_i be the number of ways of getting exactly i successes in NT trials.

When Bernoulli calculates $\frac{W_{NR}}{W_{NR+N}}$ which in his notation is M/L,

he gets $M/L = \frac{NRS + NS}{NRS - NR + R} * \frac{NRS + NS - S}{NRS - NR + 2R} * \ldots * \frac{NRS + S}{NRS}$

Dividing the numerators and denominators by N, he gets

$$M/L = \frac{RS + S}{RS - R + \frac{R}{N}} * \frac{RS + S - \frac{S}{N}}{RS - R + \frac{2R}{N}} * \ldots * \frac{RS + \frac{S}{N}}{RS}$$

He says as N approaches infinity we can ignore all the terms at the end of each numerator and denominator which are divided by N.

So he gets $\frac{RS + S}{RS - R} * \frac{RS + S}{RS - R} * \ldots * \frac{RS}{RS}$

So since $\frac{RS + S}{RS - R} > 1$, then as N approaches infinity,

$[(RS + S)/(RS - R)]^N$ also approaches infinity.

He concludes that M/L approaches infinity as N approaches infinity.

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