for $n = 1, 2, \ldots, H$, *then*

$$G(n) = \sum_{k=0}^{n} (-1)^{n-k} \binom{n}{k} F(k) \qquad (2)$$

for all these n.

But the truth of (1) for a single n by no means implies the truth of (2) for that n.

Yours sincerely,

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Chemical correspondence continued

DEAR DOUGLAS,

I was most interested to read about your ingenious use of splines to solve Dr Morris's problem in *Gazette* No. 426 (December 1979). An alternative method is as follows.

Let $N(t)$ be the number of distributions with total t. Then $N(t)$ is the coefficient of x^t in

$$(x^{-I} + x^{-I+1} + \ldots + x^I)^n.$$

(To see this, use Dr Morris's description of the problem on p. 234 and imagine multiplying out n brackets, each being $(x^{-I} + x^{-I+1} + \ldots + x^I)$.) Therefore $N(t)$ is the coefficient of x^{t+nI} in

$$(1 + x + \ldots + x^{2I})^n$$

$$= (1 - x^J)^n(1 - x)^{-n}, \quad \text{where } J = 2I + 1 \text{ as in your article,}$$

$$= \left\{1 - \binom{n}{1}x^J + \binom{n}{2}x^{2J} - \ldots + (-1)^n\binom{n}{n}x^{nJ}\right\}$$

$$\times \left\{1 + \binom{n}{1}x + \binom{n+1}{2}x^2 + \binom{n+2}{3}x^3 + \ldots\right\}.$$

Let q be the quotient and r the remainder when $t + nI$ is divided by J, so that

$$t + nI = qJ + r, \quad \text{where } 0 \leqslant r < J.$$

Then

$$N(t) = \binom{n+t+nI-1}{t+nI} - \binom{n}{1}\binom{n+t+nI-J-1}{t+nI-J} + \binom{n}{2}\binom{n+t+nI-2J-1}{t+nI-2J} - \ldots$$

$$+ (-1)^q\binom{n}{q}\binom{n+r-1}{r}.$$

It is straightforward to check that this agrees with your formula at the foot of p. 237. Note that both our methods use inequalities somewhere. They are explicit in your $(x)_+^{[n-1]}$ and in my definition of q and r.

Yours sincerely,

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