To determine ϕ_1 from Eq. (22) we use the process

$$\phi_1^{(P+1)} = k^{-1}X^{(1)}\phi_1^{(P)} + (M-T)^{-1}S \quad . \tag{26}$$

We seek ϕ_1 in the same manner as we sought ϕ, except that we iterate with the matrix $X^{(1)}$ instead of with X. Since $X^{(1)}$ has all zeros in the first row we are effectively iterating with the reduced matrix obtained by deleting the first row and first column from $X^{(1)}$. This reduced matrix has eigenvalues λ_i , $i = 2$ to L. The process will converge if $|\lambda_2| < k$. Otherwise, the process will diverge to the vector

$$x_2^{(1)} = \frac{x_1}{x_{1,1}} - \frac{x_2}{x_{1,2}} \quad . \tag{27}$$

In the case of divergence we use $x_2^{(1)}$ to modify $X^{(1)}$ to $X^{(2)}$ in the same fashion as X was modified to $X^{(1)}$. Thus

$$X^{(2)} = X^{(1)} - [x_{2,2}^{(1)}]^{-1}x_2^{(1)}r_2^{(1)} \quad , \tag{28}$$

where $r_2^{(1)}$ is the row vector identical to the second row, that is, the first non-zero row of $X^{(1)}$.

Note, from Eq. (19), that $x_2^{(1)}$ has zero in the first position. It follows, from Eq. (28), that $X^{(2)}$ has all zeros in the first two rows. In addition

$$X^{(2)}x_i^{(2)} = \lambda_i x_i^{(2)} \quad , \quad i \geqslant 3 \quad , \tag{29}$$

where

$$x_i^{(2)} = \frac{x_2^{(1)}}{x_{2,2}^{(1)}} - \frac{x_i^{(1)}}{x_{2,i}^{(1)}} \quad . \tag{30}$$

The vector ϕ_1 can be expressed in terms of a vector ϕ_2 obtained by iterating with the matrix $X^{(2)}$. In similar fashion to the derivation of Eq. (25) we find

$$\phi_1 = \phi_2 - \frac{[r_2^{(1)}\phi_2]}{\lambda_2 - k} \cdot \frac{x_2^{(1)}}{x_{2,2}^{(1)}} \quad , \tag{31}$$

with ϕ_2 determined from

$$\phi_2^{(P+1)} = k^{-1}X^{(2)}\phi_2^{(P)} + (M-T)^{-1}S \quad . \tag{32}$$

Since $X^{(2)}$ has all zeros in the first two rows, we are effectively iterating with the reduced matrix formed by deleting the first two rows and first two columns from $X^{(2)}$.

This reduced matrix has eigenvalues λ_i, $i = 3$ to L. The process will converge if $|\lambda_3| < k$.

In practice, it is awkward to form explicitly the matrices $X^{(1)}$, $X^{(2)}$, etc. We prefer to continue iterating with X as in Eq. (10). This can be done if $(M-T)^{-1}S$ is found separately in an initial iteration. (Set F to zero for this initial iteration.) If, at the stage of Eq. (32), we form $X\phi_2^{(P)}$ instead of $X^{(2)}\phi_2^{(P)}$, then the following steps will recover the latter vector.

1) Obtain $X^{(1)}\phi_2^{(P)}$ by deducting from $X\phi_2^{(P)}$, a vector proportional to x_1 so as to make the first element zero. For proof, postmultiply Eq. (16) through by $\phi_2^{(P)}$.

2) Obtain $X^{(2)}\phi_2^{(P)}$ by deducting from $X^{(1)}\phi_2^{(P)}$ a vector proportional to $x_2^{(1)}$, so as to make the second element zero. For proof, postmultiply Eq. (28) through by $\phi_2^{(P)}$.

The quantity $[r_2^{(1)}\phi_2]$ in Eq. (31) is the second element of $X^{(1)}\phi_2$, obtained from step 1) above after convergence.

In the application of Spinks and Manning[2] it is found that, in most situations, only λ_1 is greater than k. In some situations, the second eigenvalue can also be greater than k.

Convergence of the source iteration technique, for problems involving an external source in a supercritical reactor-without-external-source, is obtained by using additional iteration cycles for each of the divergent error modes. After each divergent iteration cycle the iterating matrix is modified, either explicitly or implicitly as discussed above, using Wielandt's deflation method[1]. After all divergent error modes have been eliminated, a final iteration cycle yields the solution.

Corrigendum

L. Amyot and P. Benoist, "First-Flight Collision Probabilities in Pin Clusters and Rod Lattices," *Nucl. Sci. Eng.*, **28**, 215 (1967).

The authors have requested publication of the following changes in the text.

1) The second equation on page 216 should read

$$P_{ij,k} = \left[\Sigma_i/V_i\right] \int_{(V_j)} d^3\vec{r} \int_{(V_i)} d^3\vec{r'} \times \frac{\exp(-\widetilde{\Sigma R})}{4\pi R^2} \cdot (3\Omega_k^2) \quad .$$

2) Replace the last two lines on page 216 with

> . . . the channel, $P_{js,k}$ the probability for a neutron born uniformly and isotropically in j to escape from the surface S without collision, $P_{sj,k}$ the probability for a neutron entering the channel according to a uniform and . . . .

3) The final equation of the left column of page 217 should read

$$Ki_m(x) = \int_0^{\frac{\pi}{2}} \exp\left(-\frac{x}{\sin\psi}\right) \sin^{m-1}\psi d\psi \quad .$$