which is equivalent to saying that $n_s$ linearly extrapolated to a distance $\lambda/\sqrt{3}$ outside the boundary vanishes. The "fast" neutrons have no reflected part in any case so that the boundary condition to be generally used in addition to (8a) is:

$$n_f = 0 \quad \text{at } R + \lambda_f/\sqrt{3} = 0 \tag{8b}$$

i.e., at a distance $\lambda/\sqrt{3}$ outside the boundary (at radius R). The two conditions (8a) and (8b) are sufficient to determine the ratio

$$a'/a''$$

in the distribution (1) and in addition the critical radius R. This will be the radius for which all conditions are fulfilled so that the balance of lost and gained neutrons described in the first paragraph of this section is maintained. If the critical radius is exceeded, not enough neutrons will find their way out through the surface and a chain reaction will begin.

The explicit connection between radius and albedo is obtained by using the distributions (1) in the expressions (8a) and (8b). A somewhat simpler formula is obtained by introducing the extrapolated values of $n_s$ and $dn_s/dr$ at a point $\lambda/\sqrt{3}$ beyond the physical surface of the reacting material.

If $R_o$ is the radius at this new point, the conditions

$$n_f = 0 \tag{9a}$$

and

$$n_s = \gamma\left(n_s - 2\,\frac{\lambda_s}{\sqrt{3}}\,\frac{dn_s}{dr}\right) - 2\epsilon\gamma\,\frac{\lambda_f}{\sqrt{3}}\,\frac{v_f}{v_s}\,\frac{dn_f}{dr} \tag{9b}$$

are obtained at $r = R_o$. After calculating $R_o$ one gets the physical radius R from

$$R = R_o - \lambda_s/\sqrt{3} \tag{10}$$

We use $\lambda_s$ rather than $\lambda_f$ or an average $\lambda$ because the "slow" neutrons always far outnumber the "fast" ones.

It will be simpler to write an equation expressing the albedo $\gamma$ in terms of $R_o$ instead of expressing $R_o$ as a function of $\gamma$.

$$\frac{1-\alpha'\alpha''}{(1-\alpha'/\alpha'')(1+2\lambda_s/\sqrt{3}\,R_o)-(\lambda_s/\sqrt{3}+\epsilon\alpha'\lambda_f/\sqrt{3})2k'\cot k'R_o+2k''(\lambda_s\alpha'/\sqrt{3}\,\alpha''+\epsilon\alpha'\lambda_f/\sqrt{3}} \tag{11}$$

In deriving this $\coth k''R_o$ was replaced by unity, which is justified by the large value of k". One should not expect this formula to be valid for critical radii $R_o$ less than $\lambda/\sqrt{3}$. However, radii so small are of little interest since they could be reached only with an albedo much closer to