(21.8) Calculate the decontamination factor required for (a) fission product activity, and (b) for gadolinium in commercial plutonium nitrate produced from PWR fuel (Tables 21.2 and 21.7) at t_{cool} 10 y.

Data from Table 21.2 for individual activities. Used to calculate total activity.

$i := 1 .. 29$

i	$A_i :=$
1	17.3
2	0.022
3	0.0002
4	0.015
5	183
6	$8 \cdot 10^{-7}$
7	2180
8	2130
9	0.068
10	0.028
11	$2 \cdot 10^{-5}$
12	0.49
13	22.2
14	22
15	1
16	0.004
17	0.007
18	1.31
19	0.036
20	45.4
21	11.2
22	0.001
23	3230
24	2900
25	6.30
26	6.38
27	363
28	12
29	228
	$5 \cdot 10^{-5}$

$$R_{tot} := \sum_{k=1}^{29} A_k \cdot 10^{12} \qquad R_{tot} = 1.136 \cdot 10^{16} \qquad m_{Pu} := 8.69$$

(a) $$DF_{FP} := \frac{R_{tot}}{1.5 \cdot 10^{9} \cdot m_{Pu}} \qquad DF_{FP} = 8.7 \cdot 10^{5}$$

$$C_{maxGd} := 4.4 \cdot 8 \cdot 10^{-6} \qquad C_{GD} := 0.12$$

(b) $$DF_{GD} := \frac{0.12}{C_{maxGd} \cdot m_{Pu}} \qquad DF_{GD} = 3.9 \cdot 10^{2}$$