Importance Measures and Chaos
(Duflot, 2006)

Let's Take a Look at RAW

$$RAW = P(S|e)/P(S)$$

All importance measures are built on conditional probabilities.
They are calculated from the minimal cutsets generated for S.
With any sufficiently large and interesting system, the cutsets are truncated.

But generating MCS with truncation and then calculating the importance measures can have problems:

a * P   1e-3 * 1e-9 = 1e-12
-- truncation limit 1e-13
b * Q   1e-6 * 1e-8 = 1e-14

If there is no recalculation of the MCS:

p(S|a) = p(P) = 1e-09   RAW(S,a) = 1e-3
p(S|b) = p(a*P) = 1e-12   RAW(S,b) = 1

But generating MCS with truncation and then calculating the importance measures can have problems:

a * P   1e-3 * 1e-9 = 1e-12

-- truncation limit 1e-13

b * Q   1e-6 * 1e-8 = 1e-14

However, if there is regeneration of the MCS:

p(S|a) = p(P) = 1e-09   RAW(S,a) = 1e-3

p(S|b) = p(a*P + Q) = 1.1e-08   RAW(S,b) ≈ 1e-4

Moreover, while a given truncation limit may be good for calculating an end state, like CDF, the order and value of importance measures may be chaotic at this same truncation value. Dr. Duflot demonstrated these effects on the French reference PSA.