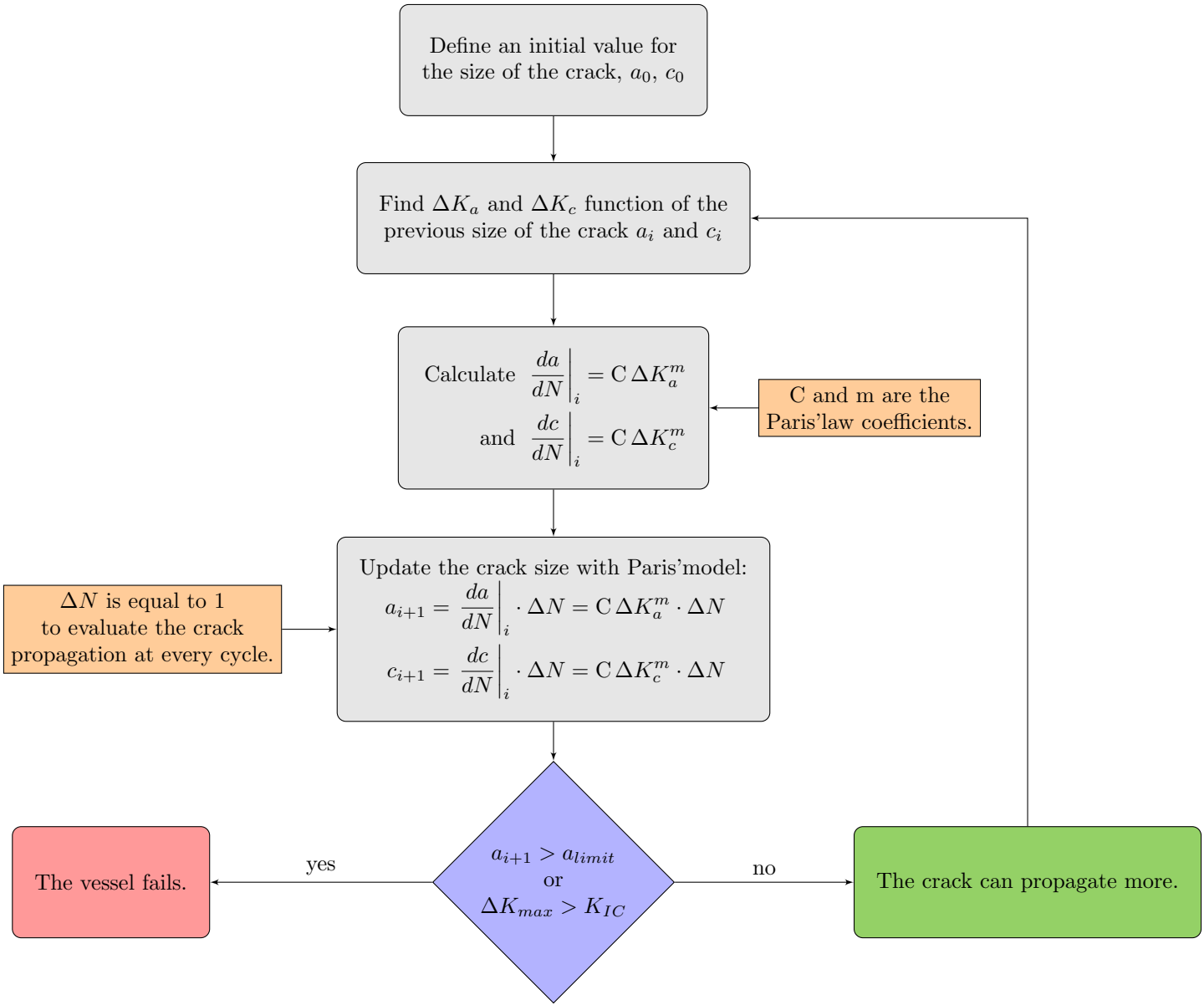
Define an initial value for the size of the crack, a_0, c_0
Find ΔK_a and ΔK_c function of the previous size of the crack a_i and c_i
Calculate $\left.\frac{da}{dN}\right|_i = \mathrm{C}\,\Delta K_a^m$ and $\left.\frac{dc}{dN}\right|_i = \mathrm{C}\,\Delta K_c^m$
C and m are the Paris'law coefficients.
Update the crack size with Paris'model: $a_{i+1} = \left.\frac{da}{dN}\right|_i \cdot \Delta N = \mathrm{C}\,\Delta K_a^m \cdot \Delta N$ $c_{i+1} = \left.\frac{dc}{dN}\right|_i \cdot \Delta N = \mathrm{C}\,\Delta K_c^m \cdot \Delta N$
ΔN is equal to 1 to evaluate the crack propagation at every cycle.
$a_{i+1} > a_{limit}$ or $\Delta K_{max} > K_{IC}$
yes
The vessel fails.
no
The crack can propagate more.