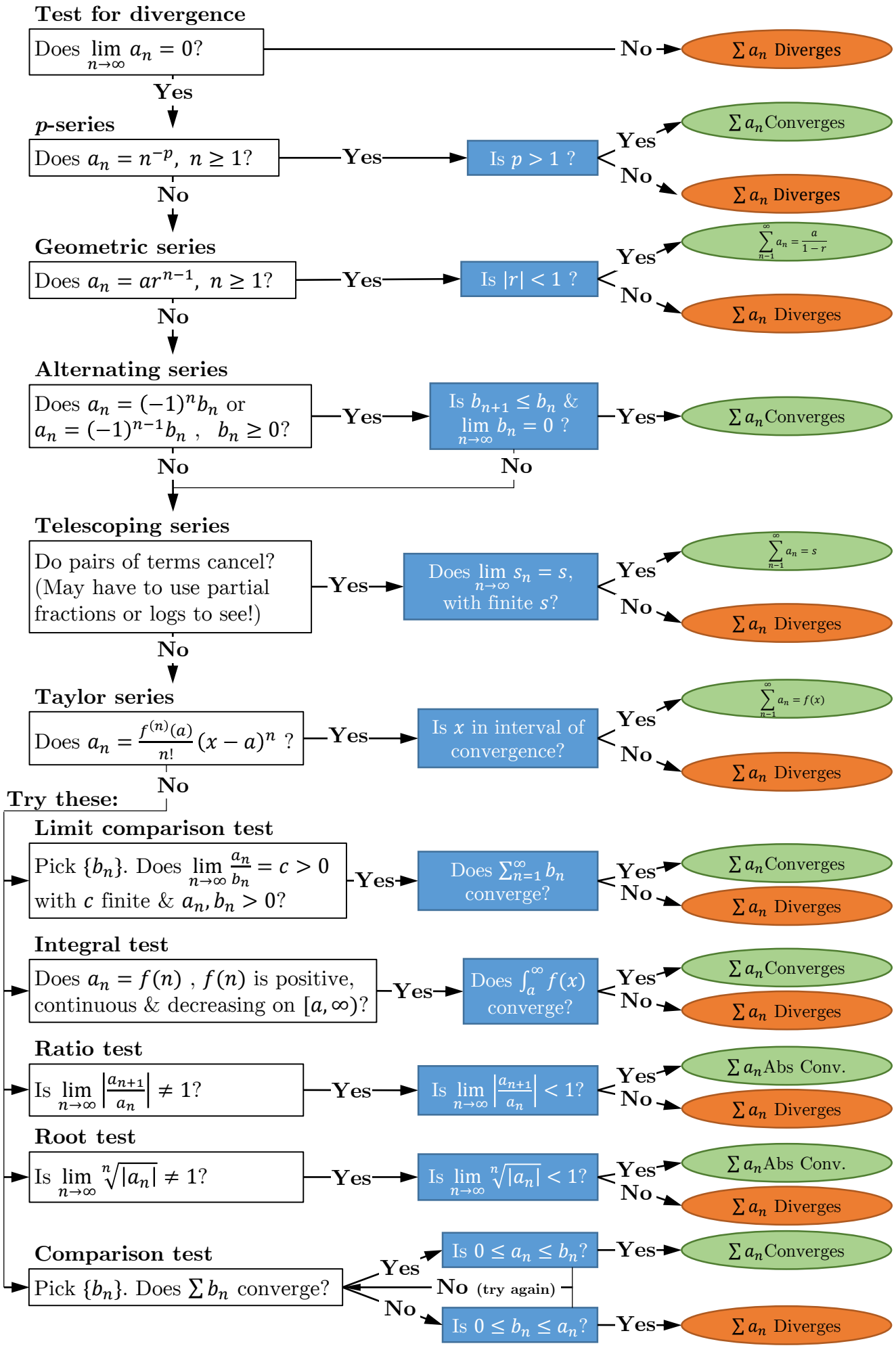
Test for divergence
Does $\lim_{n\to\infty} a_n = 0$?
No
$\sum a_n$ Diverges
Yes
p-series
Does $a_n = n^{-p},\ n \geq 1$?
Yes
Is $p > 1$?
Yes
$\sum a_n$ Converges
No
$\sum a_n$ Diverges
No
Geometric series
Does $a_n = ar^{n-1},\ n \geq 1$?
Yes
Is $|r| < 1$?
Yes
$\sum_{n=1}^{\infty} a_n = \frac{a}{1-r}$
No
$\sum a_n$ Diverges
No
Alternating series
Does $a_n = (-1)^n b_n$ or $a_n = (-1)^{n-1} b_n$, $b_n \geq 0$?
Yes
Is $b_{n+1} \leq b_n$ & $\lim_{n\to\infty} b_n = 0$?
Yes
$\sum a_n$ Converges
No
No
Telescoping series
Do pairs of terms cancel? (May have to use partial fractions or logs to see!)
Yes
Does $\lim_{n\to\infty} s_n = s$, with finite s?
Yes
$\sum_{n=1}^{\infty} a_n = s$
No
$\sum a_n$ Diverges
No
Taylor series
Does $a_n = \frac{f^{(n)}(a)}{n!}(x-a)^n$?
Yes
Is x in interval of convergence?
Yes
$\sum_{n=1}^{\infty} a_n = f(x)$
No
$\sum a_n$ Diverges
No
Try these:
Limit comparison test
Pick $\{b_n\}$. Does $\lim_{n\to\infty} \frac{a_n}{b_n} = c > 0$ with c finite & $a_n, b_n > 0$?
Yes
Does $\sum_{n=1}^{\infty} b_n$ converge?
Yes
$\sum a_n$ Converges
No
$\sum a_n$ Diverges
Integral test
Does $a_n = f(n)$, $f(n)$ is positive, continuous & decreasing on $[a, \infty)$?
Yes
Does $\int_a^{\infty} f(x)$ converge?
Yes
$\sum a_n$ Converges
No
$\sum a_n$ Diverges
Ratio test
Is $\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right| \neq 1$?
Yes
Is $\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right| < 1$?
Yes
$\sum a_n$ Abs Conv.
No
$\sum a_n$ Diverges
Root test
Is $\lim_{n\to\infty} \sqrt[n]{|a_n|} \neq 1$?
Yes
Is $\lim_{n\to\infty} \sqrt[n]{|a_n|} < 1$?
Yes
$\sum a_n$ Abs Conv.
No
$\sum a_n$ Diverges
Comparison test
Pick $\{b_n\}$. Does $\sum b_n$ converge?
Yes
Is $0 \leq a_n \leq b_n$?
Yes
$\sum a_n$ Converges
No (try again)
No
Is $0 \leq b_n \leq a_n$?
Yes
$\sum a_n$ Diverges