Numerical Methods – Q5: Integration [Practice/E]
(12/6/21)

Use the following Trapezium Rule estimates to obtain extrapolated values for T_{16} and T_{∞}.

n	T_n
1	0.785398
2	1.053137
4	1.146955
8	1.180051

Solution

n	T_n	$T_n - T_{\frac{n}{2}}$	Ratios
1	0.785398		
2	1.053137	0.267739	
4	1.146955	0.093818	0.350408
8	1.180051	0.033096	0.352768

[The values of k that are actually realised for the integration methods are often significantly different from the theoretical ones, and can be higher or lower.]

$T_{16} \approx T_8 + 0.35(T_8 - T_4) = 1.191635$
$T_\infty \approx T_8 + \frac{0.35}{1-0.35}(T_8 - T_4) = 1.197872$
Estimate for T: 1.20 (2dp) looks secure.