We establish the formula again for t_n; the others are obtained similarly.

$$\begin{aligned}
I_n &= \int \tan^n \theta \, \mathrm{d}\theta \quad (n \geq 2) \\
&= \int \tan^{n-2} \theta tan^2\theta \, \mathrm{d}\theta \\
&= \int \tan^{n-2} \theta (\sec^2 \theta - 1) \, \mathrm{d}\theta \\
&= \int \tan^{n-2} \theta \tan \theta - \int \tan^{n-2} \theta \, \mathrm{d}\theta \\
&= \frac{1}{n-1} \tan^{n-1} \theta - I_{n-2}
\end{aligned}$$

$$\left.\begin{aligned}
t_n &= -t_{n-2} + \frac{1}{n-1} \tan^{n-1} \theta \\
t'_n &= -t'_{n-2} - \frac{1}{n-1} \cot^{n-1} \theta
\end{aligned}\right\}$$

$$\left.\begin{aligned}
T_n &= T_{n-2} - \frac{1}{n-1} \tanh^{n-1} \theta \\
T'_n &= T'_{n-2} - \frac{1}{n-1} \coth^{n-1} \theta
\end{aligned}\right\}$$

$$\begin{aligned}
3.c'_n &= \int \sec^n \theta \, \mathrm{d}\theta \\
s'_n &= \int \csc^n \theta \, \mathrm{d}\theta
\end{aligned}$$

$$\begin{aligned}
3'.C'_n &= \int \mathrm{sech}^n \theta \, \mathrm{d}\theta \\
S'_n &= \int \mathrm{csch}^n \theta \, \mathrm{d}\theta
\end{aligned}$$

Again we obtain the formula for c'_n, the others being obtained similarly.

$$\begin{aligned}
c'_n &= \int \sec^n \theta \, \mathrm{d}\theta \quad (n \geq 2) \\
&= \int \sec_u^{n-2} \theta \sec_{dv}^2 \, \mathrm{d}\theta \\
&= \sec^{n-2} \theta \tan \theta - \int \tan \theta .(n-2) \sec^{n-3} \theta \sec \theta \tan \theta \mathrm{d}\theta \\
&= \sec^{n-2} \theta \tan \theta - (n-2) \int \sec^{n-2} \theta (sec^2\theta - 1) \, \mathrm{d}\theta \\
&= sec^{n-2}\theta \tan \theta - (n-2)c'_n + (n-2)c'_{n-2} \\
(n-1)c'_n &= (n-2)c'_{n-2} + \sec^{n-2} \theta \tan \theta \\
c_n &= \frac{n-2}{n-1} c'_{n-2} + \frac{1}{n-1} \sec^{n-2} \theta \tan \theta
\end{aligned}$$