Theorem The uniform distribution is a special case of the TSP distribution when $n = 1$.

Proof The TSP distribution has the probability density function

$$f(x) = \begin{cases} \frac{n}{b-a}\left(\frac{x-a}{m-a}\right)^{n-1} & a < x < m \\ \frac{n}{b-a}\left(\frac{b-x}{b-m}\right)^{n-1} & m \le x < b. \end{cases}$$

When $n = 1$ this probability density function becomes

$$\begin{aligned} f(x) &= \begin{cases} \frac{1}{b-a}\left(\frac{x-a}{m-a}\right)^{1-1} & a < x < m \\ \frac{1}{b-a}\left(\frac{b-x}{b-m}\right)^{1-1} & m \le x < b \end{cases} \\ &= \begin{cases} \frac{1}{b-a} & a < x < m \\ \frac{1}{b-a} & m \le x < b \end{cases} \\ &= \frac{1}{b-a}, \qquad a < x < b \end{aligned}$$

which is the probability density function of a $U(a, b)$ random variable.

APPL verification: The APPL statements

```
assume(a < m);
assume(m < b);
TSPRV := [[x -> (n / (b - a)) * ((x - a) / (m - a)) ^ (n - 1),
           x -> (n / (b - a)) * ((b - x) / (b - m)) ^ (n - 1)],
          [a, m, b], ["Continuous", "PDF"]]:
subs(n = 1, TSPRV);
```

yield

$$f(x) = \frac{1}{b-a} \qquad a < x < b,$$

the probability density function of a $U(a, b)$ random variable.