

Answer on Question #52500, Math, Calculus

One might remove the discontinuity by assigning to value $f\left(\frac{\pi}{2}\right)$ the limit $\lim_{x \rightarrow \frac{\pi}{2}} f(x)$.

Limit $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan\left(\frac{\pi}{4} - x\right)}{\tan(2x)}$ has indeterminate form $\frac{0}{0}$. In order to use L'Hopitals rule, let us

rewrite it as
$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{1}{\frac{\tan\left(\frac{\pi}{4} - x\right)}{\tan(2x)}} = \lim_{x \rightarrow \frac{\pi}{2}} \frac{1}{\frac{-2}{\frac{\sin^2 2x}{\frac{1}{\cos^2\left(\frac{\pi}{4} - x\right)}}}} = \frac{1}{2 \cdot 2} = \frac{1}{2}$$
 .

Thus, one might remove the discontinuity by setting $f\left(\frac{\pi}{2}\right) = \frac{1}{2}$.