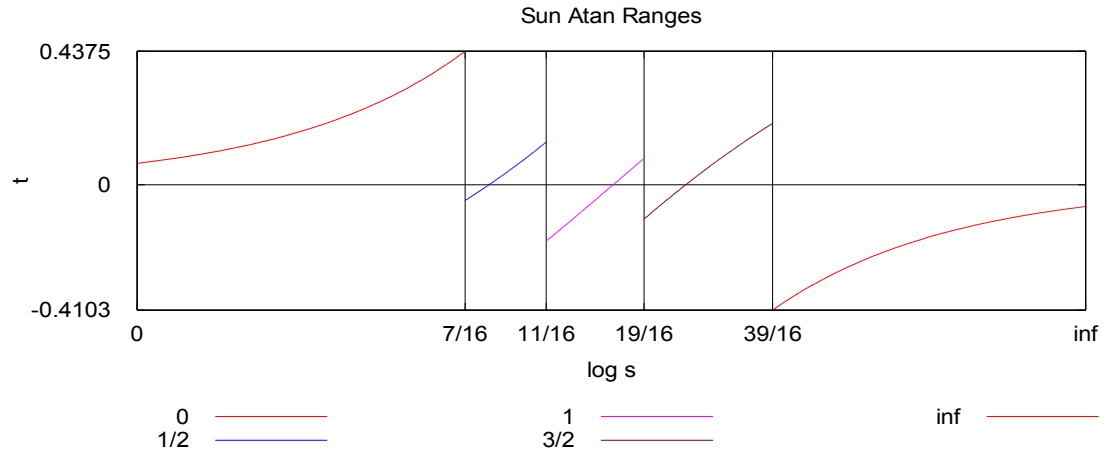


Corrected Arctangent Proposal

Satin Hinge

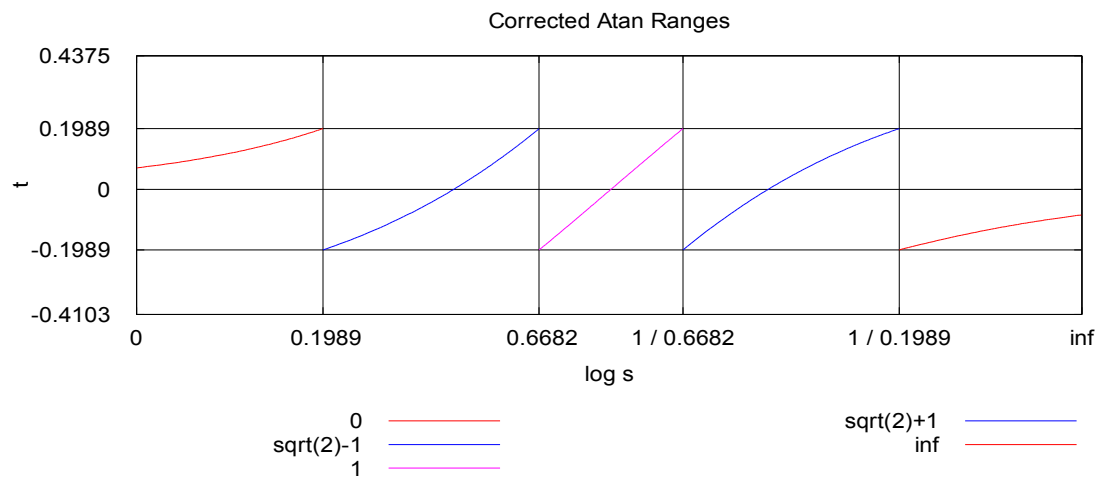
Current state of *atan* in FDLIBM library:



$$\arctan(s) = \arctan(k) + \arctan(t)$$

$$\left\{ \begin{array}{lll} 0 \leq s \leq \frac{7}{16} & k=0 & t=s \\ \frac{7}{16} \leq s \leq \frac{11}{16} & k=\frac{1}{2} & t=\frac{t-k}{1+kt} \\ \frac{11}{16} \leq s \leq \frac{19}{16} & k=1 & t=\frac{t-k}{1+kt} \end{array} \right\} \left\{ \begin{array}{lll} \frac{19}{16} \leq s \leq \frac{39}{16} & k=\frac{3}{2} & t=\frac{t-k}{1+kt} \\ \frac{39}{16} \leq s \leq \infty & k=\infty & t=-\frac{1}{s} \end{array} \right\}$$

Proposed state:



$$\begin{aligned}
& atan(s) = atan(k) + atan(t) \\
& \left\{ \begin{array}{lll}
0 \leq s \leq \sqrt{4+2\sqrt{2}} - \sqrt{2} - 1 & k=0 & t=s \\
\sqrt{4+2\sqrt{2}} - \sqrt{2} - 1 \leq s \leq \sqrt{4-2\sqrt{2}} - \sqrt{2} + 1 & k=\sqrt{2}-1 & t=\frac{t-k}{1+k\,t} \\
\sqrt{4-2\sqrt{2}} - \sqrt{2} + 1 \leq s \leq \sqrt{4-2\sqrt{2}} + \sqrt{2} - 1 & k=1 & t=\frac{t-k}{1+k\,t} \\
\sqrt{4-2\sqrt{2}} + \sqrt{2} - 1 \leq s \leq \sqrt{4+2\sqrt{2}} + \sqrt{2} + 1 & k=\sqrt{2}+1 & t=\frac{t-k}{1+k\,t} \\
\sqrt{4+2\sqrt{2}} + \sqrt{2} + 1 \leq s \leq \infty & k=\infty & t=-\frac{1}{s}
\end{array} \right\}
\end{aligned}$$