Determine whether the series is convergent or divergent. If it is convergent, find its sum.[1]

$$\sum_{k=1}^{\infty} \frac{k^2}{k^2 - 2k + 5}$$

We suspect divergence since $\frac{k^2}{k^2}$ behaves like 1, so we'll apply the test for divergence.

$$\begin{aligned}
\lim_{k\to\infty} \frac{k^2}{k^2 - 2k + 5} &= \lim_{k\to\infty} \frac{\frac{k^2}{k^2}}{\frac{k^2}{k^2} - \frac{2k}{k^2} + \frac{5}{k^2}} \\
&= \lim_{k\to\infty} \frac{1}{1 - \frac{2}{k} + \frac{5}{k^2}} \\
&= 1
\end{aligned}$$

Since $\lim_{k\to\infty} \frac{k^2}{k^2-2k+5} = 1 \neq 0$, the series is divergent by the Test for Divergence.

[1] Stewart, *Calculus, Early Transcendentals*, p. 716, #30.