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Wright, Cory; Osler, Thomas J.

Four derivations of an interesting bilateral series generalizing the series for zeta of 2.

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Summary: We present four derivations of the closed form of the partial fractions expansion

$$\pi\left(\frac{\cot \pi a}{b-a}-\frac{\cot \pi b}{a-b}\right)=\sum_{n=-\infty}^{\infty}\frac{1}{(n+a)(n+b)}.$$

This interesting series is a generalization of the series $\frac{\pi^2}{6}=\sum_{n=1}^{\infty}\frac{1}{n^2}=\zeta(2)$ made famous by Euler.

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