Looks like I was manually unrolling one representation of the Riemann prime counting function here, though to what end I don't really recall...

$$\Pi_1(n)=\sum_{j=2}^{n} 1-\Pi_2(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_1(n)=n-1-\sum_{j=2}^{n} \Pi_2(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_1(n)=\sum_{j=2}^{n} 1-\frac{1}{2}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor} 1+\frac{1}{3}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor}\sum_{l=2}^{\lfloor \frac{n}{j \cdot k} \rfloor} 1-\frac{1}{4}\ldots$$

$$\Pi_2(n)=\sum_{j=2}^{n} \frac{1}{2}-\Pi_3(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_2(n)=\frac{n-1}{2}-\sum_{j=2}^{n} \Pi_3(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_2(n)=\frac{1}{2}\sum_{j=2}^{n} 1-\frac{1}{3}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor} 1+\frac{1}{4}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor}\sum_{l=2}^{\lfloor \frac{n}{j \cdot k} \rfloor} 1-\frac{1}{5}\ldots$$

$$\Pi_3(n)=\sum_{j=2}^{n} \frac{1}{3}-\Pi_4(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_3(n)=\frac{n-1}{3}-\sum_{j=2}^{n} \Pi_4(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_3(n)=\frac{1}{3}\sum_{j=2}^{n} 1-\frac{1}{4}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor} 1+\frac{1}{5}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor}\sum_{l=2}^{\lfloor \frac{n}{j \cdot k} \rfloor} 1-\frac{1}{6}\ldots$$

$$\Pi_k(n)=\sum_{j=2}^{n} \frac{1}{k}-\Pi_{k+1}(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_k(n)=\frac{n-1}{k}-\sum_{j=2}^{n} \Pi_{k+1}(\lfloor \frac{n}{j} \rfloor)$$

$$\Pi_k(n)=\frac{1}{k}\sum_{j=2}^{n} 1-\frac{1}{(k+1)}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor} 1+\frac{1}{(k+2)}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor \frac{n}{j} \rfloor}\sum_{l=2}^{\lfloor \frac{n}{j \cdot k} \rfloor} 1-\frac{1}{(k+3)}\ldots$$

$$\Pi_1(n)=n-1-\sum_{j=2}^{n}\Pi_2(\lfloor\frac{n}{j}\rfloor)$$

$$\Pi_1(n)=\sum_{j=2}^{n}1-\frac{1}{2}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor\frac{n}{j}\rfloor}1+\frac{1}{3}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor\frac{n}{j}\rfloor}\sum_{l=2}^{\lfloor\frac{n}{j\cdot k}\rfloor}1-\frac{1}{4}\ldots$$

$$\Pi_2(n)=\frac{1}{2}\sum_{j=2}^{n}1-\frac{1}{3}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor\frac{n}{j}\rfloor}1+\frac{1}{4}\sum_{j=2}^{n}\sum_{k=2}^{\lfloor\frac{n}{j}\rfloor}\sum_{l=2}^{\lfloor\frac{n}{j\cdot k}\rfloor}1-\frac{1}{5}\ldots$$

$$P_1=D_1-\frac{1}{2}D_2+\frac{1}{3}D_3-\frac{1}{4}D_4+\ldots$$

$$P_2=\frac{1}{2}D_1-\frac{1}{3}D_2+\frac{1}{4}D_3-\frac{1}{5}D_4+\ldots$$

$$P_3=\frac{1}{3}D_1-\frac{1}{4}D_2+\frac{1}{5}D_3-\frac{1}{6}D_4+\ldots$$

$$P_1-P_2=(1-\frac{1}{2})D_1-(\frac{1}{2}-\frac{1}{3})D_2+(\frac{1}{3}-\frac{1}{4})D_3-(\frac{1}{4}-\frac{1}{5})D_4+\ldots$$

$$P_1-P_2=\frac{1}{2}D_1-\frac{1}{6}D_2+\frac{1}{12}D_3-\frac{1}{20}D_4+\ldots$$

$$P_2-P_3=\frac{1}{6}D_1-\frac{1}{12}D_2+\frac{1}{20}D_3-\frac{1}{30}D_4+\ldots$$