

Prove that

$$\left[ \sum_{k=1}^n \log \left( 2 - \frac{\prod_{t=1}^{t=m} \theta_{k+t}}{(\theta_k)^m + \prod_{t=1}^{t=m} \theta_{k+t}} \right) \right] \leq n - 1,$$

where  $n \geq m \geq 2$ ,  $0 < \theta_k$  for  $1 \leq k \leq n$ , and  $\theta_{n+j} = \theta_j$  for  $j = 1$  to  $j = m$ .