Abstract:
Let \( f(x, y) = 1 + \sum_{m+n=p}^{\infty} a_{m,n} x^m y^n \) be a formal power series. We convert \( f(x, y) \)
into the formal product \( \prod_{p=1}^{\infty} (1 + g_{m,n} x^m y^n) \), namely the power product expansion in two independent variables. We provide estimates on the domain of absolute convergence of the infinite product when \( f(x, y) \) is absolutely convergent. This makes it possible to use the truncated power product expansions \( \prod_{p=1}^{m+n=p} (1 + g_{m,n} x^m y^n) \) as approximations to the analytic function \( f(x, y) \).

The results are made possible by certain algebraic properties characteristic of the expansions. We derive an asymptotic formula for the \( g_{m,n} \), with \( m \) fixed, associated with the majorizing power series. We also discuss various combinatorial interpretations provided by these power product expansions.

To attend virtually, please send a request to Dr. Ela Celikbas or Dr. Krzysztof Ciesielski.