WVU MATHEMATICS COLLOQUIUM

Factorization of Bivariate Taylor Series via Power Product

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Abstract:
Let $f(x,y) = 1 + \sum_{\substack{p=1 \\ m+n=p}}^{\infty} a_{m,n} x^m y^n$ be a formal power series. We convert $f(x,y)$ into the formal product $\prod_{\substack{p=1 \\ m+n=p}}^{\infty} (1+g_{m,n}x^m y^n)$, 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 $\prod_{\substack{p=1 \\ m+n=p}}^{P} (1+g_{m,n}x^m y^n)$ 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.