The SUMO Speaker Series for Undergraduates

(Pizza Provided)
Wednesday, March 9th
4:15-5:05, room 380C

Use of Jacobian Elliptic Functions in Engineering

Hubert Morel-Seytoux

$$\mathrm{sn}(u) = \frac{2\pi}{K\sqrt{m}} \sum_{n=0}^{\infty} \frac{q^{n+1/2}}{1-q^{2n+1}} \sin(2n+1)v,$$

$$\mathrm{cn}(u) = \frac{2\pi}{K\sqrt{m}} \sum_{n=0}^{\infty} \frac{q^{n+1/2}}{1+q^{2n+1}} \cos(2n+1)v,$$

$$\mathrm{dn}(u) = \frac{\pi}{2K} + \frac{2\pi}{K} \sum_{n=1}^{\infty} \frac{q^{n}}{1+q^{2n}} \cos 2nv.$$

ABSTRACT:

When oil reservoirs stop producing from their own energy, it is customary to inject water to displace the oil. Water is injected in one well and produced in another or several others. Different patterns of placement of the wells will have different effectiveness at maximizing the oil recovery. Typical patterns will have a doubly periodic structure. In mathematical expressions used to simulate the process Jacobian elliptic functions arose (almost) naturally.

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