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Review text:

This is a chapter from a special volume on Queueuing Networks. The author gives a quite detailed overview of the notion and use of Palm probabilities, especially for applications to queueing systems and related applied probability stochastic models. The concept appeared in a report of Conny Palm (1943), originating from his experience with telephone systems in Sweden. Palm probabilities make rigorous the concept of conditioning a point process (or, more generally, a random measure) on the event that a specific point is in the support of the point process (or random measure). It is especially useful for stationary point processes as one can take a point of view via ergodic theory. The latter was masterfully explained by Jacques Neveu (1977). Prior to Neveu's work, Palm probabilities were studied in depth by the East German probability school, notably by Joseph Mecke (1967). The author of this paper starts by explaining this point of view. Loosely speaking, Palm probabilities in queueing theory make rigorous the concept of quantities observed by a "typical customer". They often lead to balance relationships (e.g., Little's law) which, under further assumptions on the distribution of the random processes involved, may lead to explicit formulae. See François Baccelli and Pierre Brémaud (2003) for a queueing theory book written from the point of view of Palm probabilities. The paper also discusses in detail such models as piecewise deterministic Markov processes and generalized semi-Markov processes, both of which have found, in one form or another, their place in queueing theory and applied probability and both of which can be understood from the Palm point of view. A notable omission from

the paper is the article by Jim Pitman (1987) who presented excursion theory via Palm probabilities.

Bibliography used in this review:

- C. Palm (1943). Intensitätsschwankungen im Fernsprechverkehr. *Ericsson Techniks*, **44**
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- J. Mecke (1967). Stionäre zufällige Masse auf lokalkompakten Abelschen Gruppen. *Z. Wahrsch. verw. Geb.* **9**, 36-58.
- J. Pitman (1987). *Stationary excursions.* In: Séminaire de probabilités XXI. Lecture Notes in Mathematics, Volume 1247/1987, 289-302.