

Some thoughts about continuous processes

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Current problems

- cont. process responsible for step-length limitation, but doesn't know if it's necessary (and how much)
- track determined (entirely) from current particle state; updates from cont. process not considered

New design (see MR)

- work with *continuous* + *differential* states/quantities
- (differential) particle state comprises everything – geometry and kinematics
- get rid of doContinuous() → split up in *influencing* (parameter continuous state, returns differential state) and *observing* processes
- independent differential contributions can be summed up (Lorentz force, energy loss, etc.) → total differential change (n.b: not a track yet, stiff infinitesimal)
- solve equations of motion with adaptive numerical method, yields new final state:
e.g. $s(t_1) = s(t_0) + \delta s * (t_1 - t_0)$; track = going from $s(t_0)$ to $s(t_1)$
- “observing” processes (radio, long. profile generation) called after final state is determined, track as parameter

Discussion points

- Photons are most abundant and pose least problems (rectilinear track, no energy losses, no MS, ...) → special code just for them (loss of generality vs. performance gain)