2-14. At the instant shown, the collar is sliding along a smooth vertical guide rod with a horizontal speed $v = 4$ m/s and a tangential acceleration $a_t = 5$ m/s^2. If the mass of the collar follows a normal distribution $m \sim N(3, 0.2^2)$ kg, determine the normal reaction of the guide rod on the collar at this instant.

Solution: $N \sim N(33.57, 2.24^2)$ N