

RHIC Performance And The Choice Of The RF Frequency

G. Parzen

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Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

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G. Parzen

Brookhaven National Laboratory

April 3, 1984

~~RHIC~~

RHIC-PG-45

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The attached graphs ~~attach~~ indicate how the choice of the RF frequency, $h = 6 \times 57$ versus $h = 12 \times 57$ influences the intra-beam scattering and thus the RHIC performance.

Figure 2 shows that $h = 12 \times 57$ RF requires the voltage of $V = 2 \times 10^6$ compared to $V = 1 \times 10^6$ for $h = 6 \times 57$.

Figure 3 shows that the rms bunch length, σ_z in cms, at $\gamma = 100$ is

$$h = 6 \times 57 \quad \sigma_z = 110 \text{ cms}$$

$$h = 12 \times 57 \quad \sigma_z = 70 \text{ cms}$$

Figure 4 shows that $h = 12 \times 57$ RF leads to a somewhat larger emittance growth, due to the shorter bunch length, and about 10% smaller aperture than that found for $h = 6 \times 57$ RF.

AS OR 13 00

TO X TO THE HALF INCH

SQUARE

TO X TO THE HALF INCH

TO X TO THE HALF INCH

TO X TO THE HALF INCH

TO X TO THE HALF INCH

TO X TO THE HALF INCH

$$V = 1 \times 10^6$$

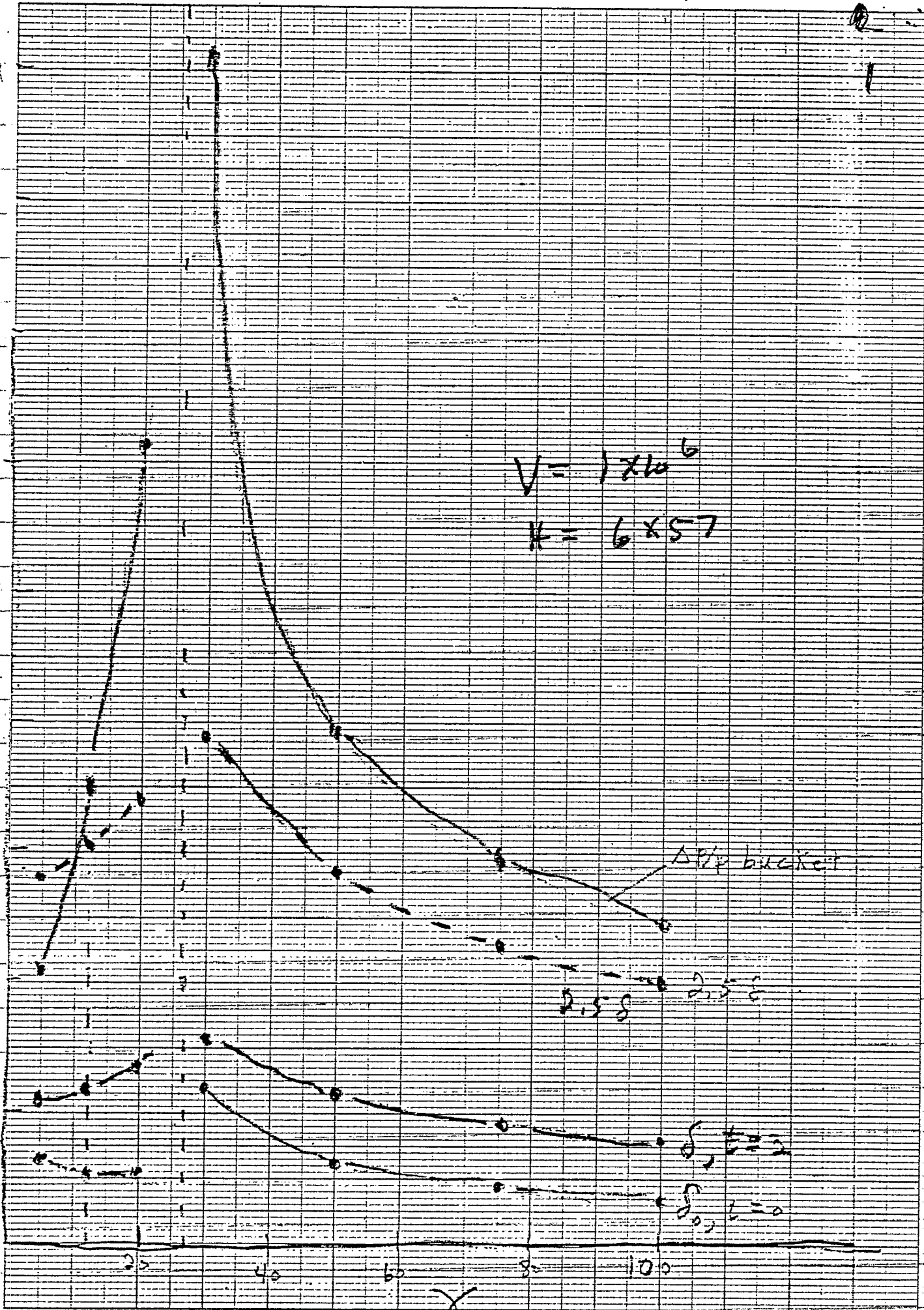
$$H = 6 \times 57$$

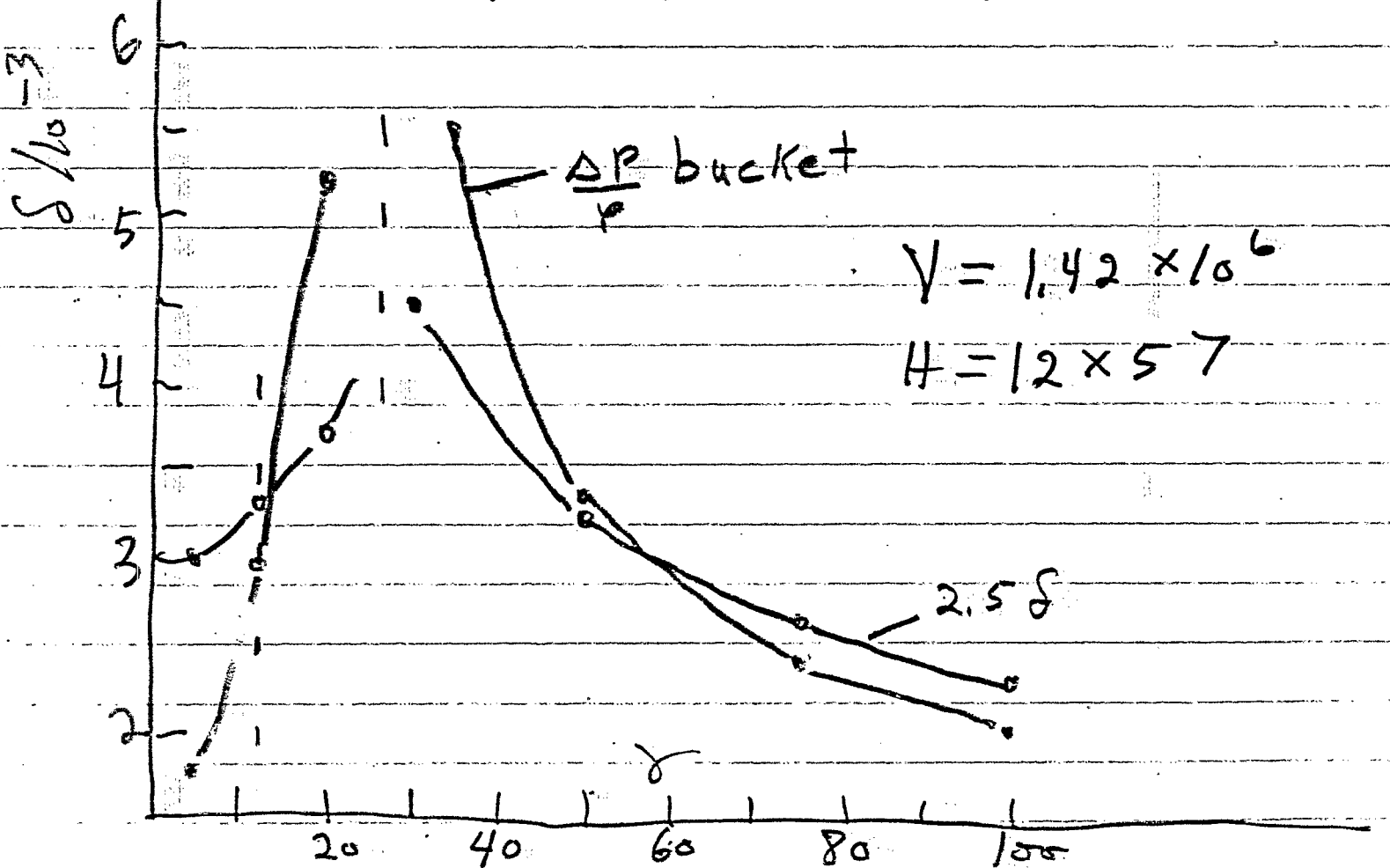
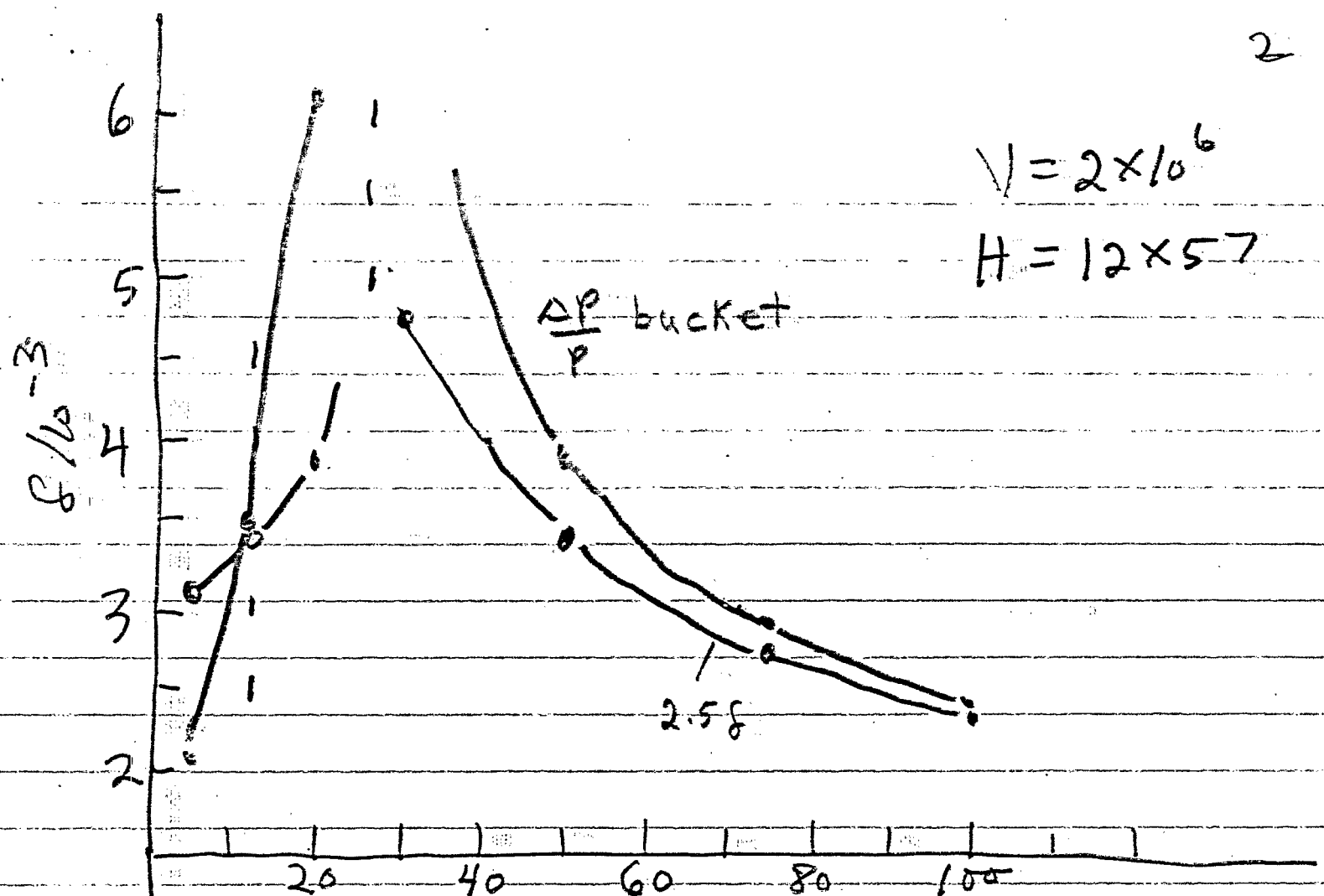
Δ/p bucket

2.58 2.58

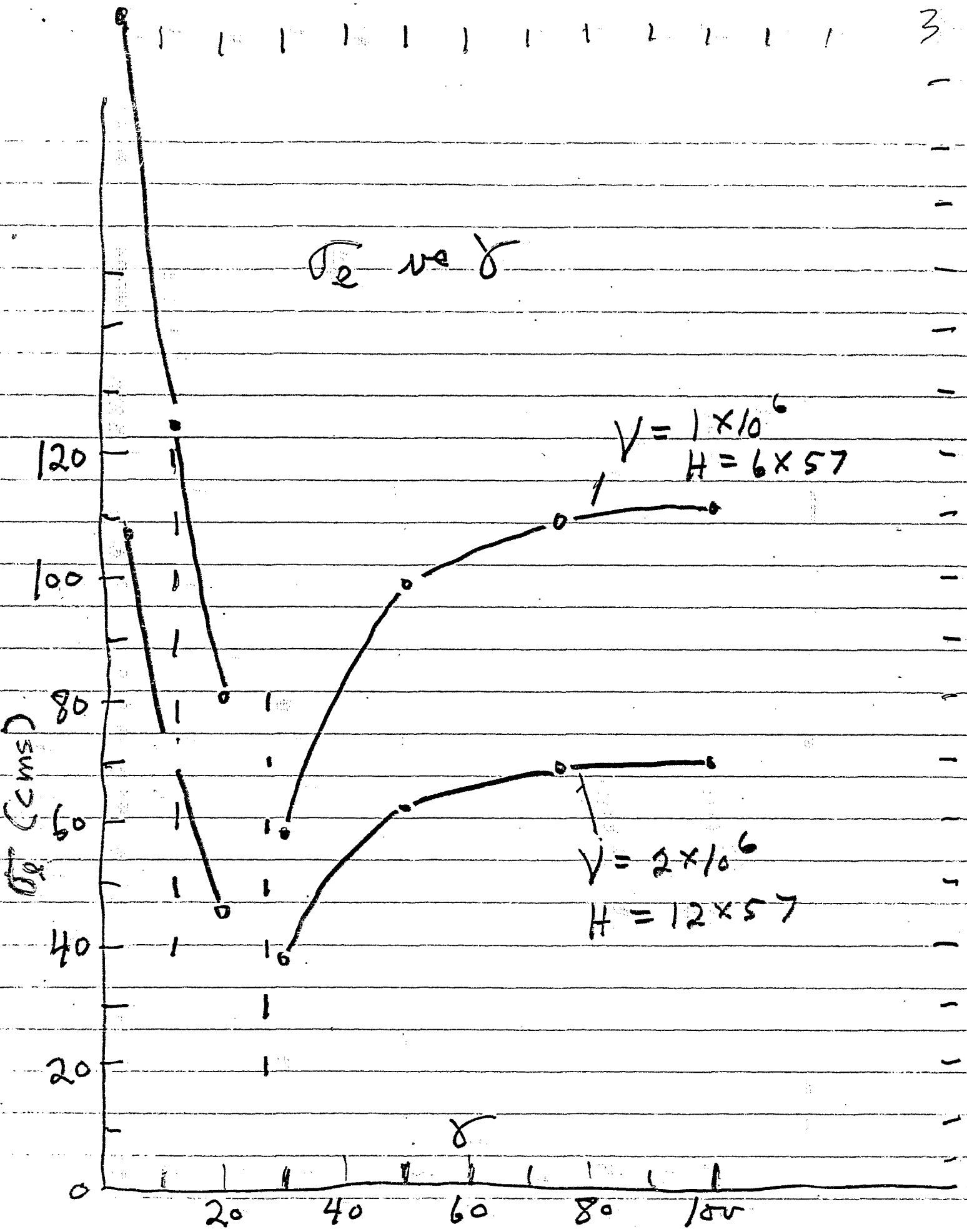
$\delta, t=2$

$\delta, t=0$





σ_e vs δ



ε vs δ

