Anna Trnková 6.A

MKI – apríl

III.U1

i, j, k jsou prvky kvaternionů/bázové vektory	$a=i$ $b=j$	$ij=-ji$ $k=-(-k)$	$ij=-ji$ $k=-(-k)$ $k=k$

III.U2 - C

$$S=\sum_{n=1}^{\infty} n=1+2+3+4+5+\ldots$$
$$T=1-1+1-1+1-1\ldots$$
$$U=1-2+3-4+5-6\ldots$$
$$S-U=4+8+12=4(1+2+3+4+\ldots)$$

$$T=1-1+1-1+1-1\ldots \mid {}^*2$$
$$2T=1-1+1-1+1-1\ldots$$
$$+0+1-1+1-1+1\ldots$$
$$2T=1+0+0+0+0+0$$
$$2T=1 \quad T=\frac{1}{2}$$

$$U=1-2+3-4+5-6\ldots \mid {}^*2$$
$$2U=1-2+3-4+5-6\ldots$$
$$+0+1-2+3-4+5\ldots$$
$$2U=1-1+1-1+1-1=T$$
$$2U=\frac{1}{2} \quad U=\frac{1}{4}$$

$$S=1+2+3+4+5+\ldots$$
$$S-U=1+2+3+4+5+\ldots$$
$$-(1-2+3-4+5\ldots)$$
$$S-U=0+4+0+8+0+12\ldots$$

$$S-U=4+8+12=4(1+2+3+4+\ldots)$$
$$S-U=4S \mid \text{-S}$$
$$3S=-U=-\frac{1}{4} \qquad S=-\frac{1}{12}$$

III.U3

Nikola Tesla	zoofilie	William Rowan Hamilton	alkoholismus
Paul Dirac	Aspergerův syndom	Isaac Newton	celoživotní panictví
Albert Einstein	vegetariánství	Alan Turing	homosexualita
Erwin Schrödinger	pedofilie	Emmy Noether	Ženská identita
Berhard Riemann	Extrémní stydlivost		

III.A – Liou Cch'-Sin

III.K – Anihilace elektronu a pozitronu

III.B

2. - screenshot z https://en.wikipedia.org/wiki/Majorana_equation

Proof

This form is not entirely obvious, and so deserves a proof. Starting with

$$-i\,\partial\!\!\!/\psi + m\,\psi_c = 0$$

Expand $\psi_c = C\,\overline{\psi}^{\mathsf{T}}$:

$$-i\,\partial\!\!\!/\psi + m\,C\,\overline{\psi}^{\mathsf{T}} = 0$$

Multiply by C use $C^2 = -1$:

$$-i\,C\,\partial\!\!\!/C^{-1}\,C\,\psi - m\,\overline{\psi}^{\mathsf{T}} = 0$$

Charge conjugation transposes the gamma matrices:

$$+i\,\partial\!\!\!/^{\mathsf{T}}\,C\,\psi - m\left(\gamma^0\right)^{\mathsf{T}}\psi^* = 0$$

Take the complex conjugate:

$$-i\,\partial\!\!\!/^{\dagger}\,C^*\,\psi^* - m\left(\gamma^0\right)^{\dagger}\psi = 0$$

The matrix γ^0 is Hermitian, $\left(\gamma^0\right)^{\dagger} = \gamma^0$ in all three representations (Dirac, chiral, Majorana):

$$-i\,\partial\!\!\!/^{\dagger}\,C^*\,\psi^* - m\,\gamma^0\,\psi = 0$$

It is also an involution, taking the Hermitian conjugate: $\gamma^0\,\gamma^\mu\,\gamma^0 = (\gamma^\mu)^\dagger$

$$-i\,\gamma^0\,\partial\!\!\!/\gamma^0\,C^*\,\psi^* - m\,\gamma^0\,\psi = 0$$

Multiply by γ^0 , note that $\left(\gamma^0\right)^2 = I$ and make use of $C^* = C$:

$$-i\,\partial\!\!\!/\gamma^0\,C\,\psi^* - m\,\psi = 0$$

The above is just the definition of the conjugate, so conclude that

$$i\,\partial\!\!\!/\psi_c - m\,\psi = 0$$